

Railway Age

FIRST HALF OF 1919—No. 21

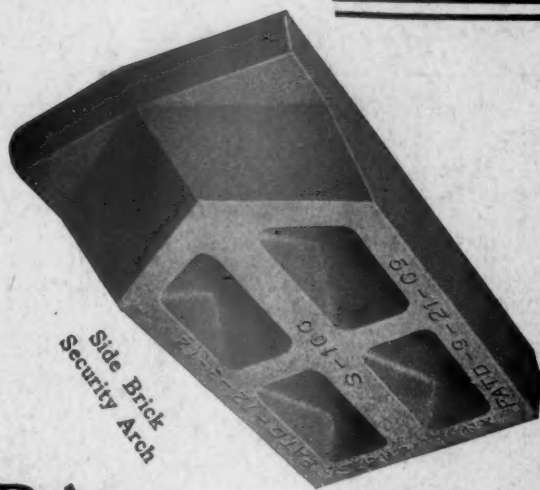
NEW YORK—MAY 23, 1919—CHICAGO

SIXTY-FOURTH YEAR

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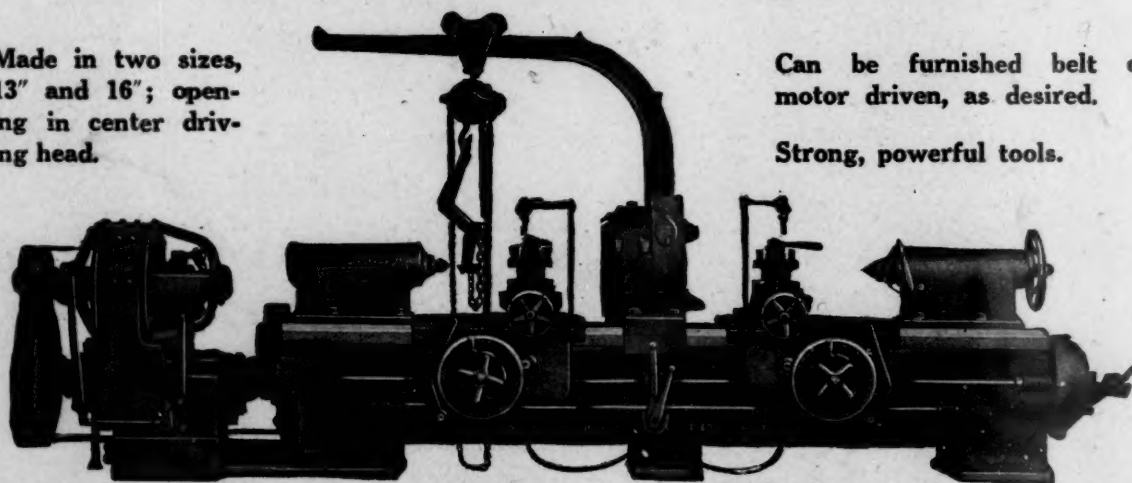
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EDITORIAL



Table of Contents will be found on Page 5 of the Advertising Section

Opening of Our London Office

THE SIMMONS-BOARDMAN Publishing Company, publisher of the *Railway Age*, has opened a new office at No. 85 Fleet Street, London, England. It has been placed in charge of Robert E. Thayer, who becomes European editor of all the publications of this company, including the *Railway Age*, the *Railway Mechanical Engineer*, the *Railway Maintenance Engineer*, the *Railway Electrical Engineer* and the *Railway Signal Engineer*.

Mr. Thayer, until his recent transfer to London, was located in our New York office and was mechanical department editor of the *Railway Age* and managing editor of the *Railway Mechanical Engineer*. The imperative necessity that the publications of this company should be represented in Europe by a member of our own editorial staff was created largely by the war. As a result of the war the people of the United States, including the officers of railways and of railway equipment and supply concerns, have become keenly interested in foreign economic and industrial affairs. The railway developments in foreign countries will in future be especially interesting to our American readers. While the people of this country are engaged in solving their railroad problem they will be interested in what the people of other countries are doing with their railroad problems. The war almost stopped the development and caused the deterioration of railways throughout the world and especially in Europe, and this has opened up a large foreign market for American railway equipment and supplies. It is believed that the *Railway Age* and other publications of this company can render an important and valuable service to the railway and the railway supply industries of the United States by furnishing to them full, up-to-date and correct information regarding the conditions of and developments on railways in other countries.

Mr. Thayer has a technical education, a railroad training and a ripe journalistic experience. We have located him in London because it is the best point in Europe from which to gather information regarding foreign railways. But London will be merely his headquarters, and he will travel extensively in Europe in quest of the kind of material which will be of interest and value to our readers and patrons.

Mr. Thayer was graduated from the Massachusetts Institute of Technology in June, 1907. For some time he was employed by the American Locomotive Company as special apprentice and in the calculating department at Schenectady. He then entered the service of the Boston & Maine in the test department and was later instructor in mechanical engineering at the Massachusetts Institute of Technology. He became connected with the *Railway Age* editorial staff in January, 1911.

Frank McManamy, the assistant director of the Division of Operation, is to be congratulated upon the letter which he

Getting the Most Out of the Conventions

has sent to the regional directors and which was noted in our issue of May 9, page 1161, suggesting that they urge the roads to send as many representatives as possible to the June mechanical department conventions, and also suggesting that each member below the rank of superintendent of motive power should render to his superior a written report of those things which specially attracted his attention at the convention and appeared to him to be of value to his particular road. The railroads have not been getting as much from the various conventions as they should, simply because they have not been prepared to take advantage of them in a scientific way. There is no question but what the larger number of officers who have gone to the conventions have earnestly tried to make the best use of their time. There is an added incentive, however, in going to the meetings with a definite object in view and of having to prepare a report in writing on new practices that may have been described or suggested at the meetings or of noteworthy devices in the exhibit. Then, too, there is the added importance of informal discussions with men holding similar positions coming from all over this country. It is now up to the mechanical department officers to do their part in earnestly trying to make the best possible use of their time in Atlantic City and of demonstrating to their superior officers that the investment in time and money is well merited. The Railway Supply Manufacturers' Association is planning on co-operating in this movement by arranging for a supply of note books specially adapted to the convenience of railroad officers in making notes.

Railway officers and railway supply men alike are vitally interested in the attitude which Congress will take toward

Stagnation in Improvement Work

the railway problems that are presented to it for solution. The first and most pressing problem is that of passing the deficiency appropriations to enable the Railroad Administration to meet its obligations already contracted and to proceed with the expenditures necessary for the proper maintenance, improvement and operation of the roads. At no time in the history of American railways has the development of our transportation facilities to meet increasing demands been so nearly at a complete standstill as within recent weeks. Less than forty million dollars worth of improvement work chargeable to additions and betterments was authorized during the first four months of this year, or only a fraction of the appropriations normally made at this season. After deducting almost one third of this amount for supplementary appropriations for work done last year and which exceeded the authorizations and an equal amount for work done last year without authority, it appears that less than fifteen million dollars worth of improvement work has been authorized for completion this year and this is confined very largely to the construction of industry tracks tending to develop new traffic and other small improvements. The roads were also permitted to proceed with approximately four hundred million

dollars worth of work authorized last year and carried over. This work is being finished at the rate of about 10 per cent per month or at a rate much greater than that at which new work is being undertaken. Therefore, unless additional work were authorized it would be a matter of only a short time until the development of our railway facilities would almost entirely stop. The history of our country has shown that the demand for transportation is always increasing except during short intervals of time, therefore the dam which has been created artificially must be broken and in the very near future. When broken, the stream of improvement work should be greater than normal in order that the facilities may catch up with the demands made upon them.

Financing the Standard

Equipment Purchase

SOMETIME AGO the Railroad Administration suggested that the standard equipment, which was ordered under war conditions and is being allocated to the different roads in accordance with the judgment of the Administration, be paid for through the issuance of one joint block of equipment trust certificates. The railway executives have approved of this suggestion, and at the meeting of the standing committee of the Association of Railway Executives on Friday morning last, and later at the afternoon meeting of the association itself, this proposal was discussed at some length. Details of the plan have not as yet been worked out. The purchases of equipment by the Administration amount to about \$400,000,000. Some of the railroads have refused to accept that which the Administration has assigned to them. Others are in a financial position which would hardly permit of their issuing equipment trust certificates at a reasonable interest rate. Whether or not the equipment is required, it has been ordered and in part delivered and must be paid for.

The Railroad Administration has its hands more than full providing working capital for the railroads it is operating, and paying the rental due the corporations. Equipment trust certificates of railroad companies with sound credit are selling at comparatively high prices. These notes, running generally for ten years, and occasionally for 15 years, have a broad market. Whether this market is broad enough to absorb \$400,000,000 new certificates so soon after the sale of the government's short term notes, it is impossible to say. If the notes are issued under what is called the Philadelphia plan, title to the equipment will be vested in a trust company and the notes will be in the form of certificates of participation in a leasehold. If they are secured simply by a pledge of the equipment with a provision for the payment of interest and a part of the principal each year from the rental received for the use of the equipment, the security will be only fair even if 10 or 15 per cent of the cost of the equipment is paid in cash and the notes outstanding represent only 90 or 85 per cent of the cost. The equipment was purchased at abnormally high prices and there might be serious difficulty in persuading the roads to rent that which has been arbitrarily assigned to them.

On the other hand, if the notes are secured by the equipment and, in addition, are guaranteed jointly by the railroad companies, they will have the best of security and ought to sell at a high price compared with other short term notes in proportion to the rate of interest paid upon them. It would seem much better to have the railroad companies guarantee the notes than to have the government do so. A government guarantee might be an entering wedge for trouble after the roads are returned to their owners. The railroads will have to meet the interest charges in any case. No road will be putting a severe strain on its credit by participating in a joint guarantee of these notes.

Four Things That Are Needed

CONGRESS MET in special session this week. It is expected to begin considering at once the legislation to be passed before the railways are returned to private operation. President Wilson has announced in his message that the railways will be returned to their owners at the end of the present year. There are at least four important things which must be done if the railways are to be returned to their owners under conditions which will enable private operation to succeed.

First, a larger part of the traffic must be got back to normal channels. Wholesale diversion of traffic was necessary while the railways were being operated primarily as an instrumentality for helping to carry on the war. Necessarily this diversion was done regardless of the effects upon individual lines. When traffic once has been turned into new channels it will not return to the old without special efforts being made to restore it to them. Of course, if there are to be wholesale changes in the ownership of the railways and they are to be grouped into entirely new systems before they are returned to private operation, it would serve no purpose to try at present to restore their traffic to the old channels. But probably there will be no wholesale changes in ownership before the return to private operation. If it becomes evident that there are not going to be, the Railroad Administration ought, in co-operation with the railroad corporations, to use its power to cause traffic to move as formerly. Otherwise some railway companies will profit enormously and some will be hurt greatly for a long time as a result of the diversions of traffic which have occurred.

Second, every effort should be made by officers of the Railroad Administration, and especially by the officers of individual lines, to increase the efficiency and economy of operation. The statistics of operation demonstrate beyond question that the railways are not being as efficiently and economically operated as they could be. There is a good deal of "passing the buck" between the managers of the individual lines and the officers of the Railroad Administration at Washington as to the reasons for this. One thing is certain, however, and this is, that if efficiency is to be restored it must be done mainly by the managers of the individual lines. It cannot be done by a few men located in Washington, however able they may be. The managers of the individual lines can do it only by each manager exercising his own initiative and using the methods and making the changes which he sees the local conditions on his own line demand. The managers of many lines say that whenever they begin to try to do this they get into trouble with some bureau or division in Washington. The officers of the Railroad Administration in Washington say the managers of the individual lines have all the authority they need. It is clear that the managers of the individual lines should exercise all the authority they possess in order to increase efficiency and that the central administration should interfere with them as little as possible. The present disparity between railway income and outgo is enormous. It is doubtful if an advance in rates sufficient completely to remedy it can be secured. A great increase in the efficiency and economy of operation is needed.

Third, rates should be advanced. While the efficiency of operation can and ought to be increased, no conceivable increase of efficiency and of traffic will be sufficient to make net earnings adequate. It is the duty of the Railroad Administration to ascertain how large the advance in rates should be and to make it before the railways are returned to private operation.

Fourth, constructive legislation should be passed by Congress, and its main purpose should be to assure to the railway companies the opportunity to earn a net return sufficient to enable them adequately to develop their facilities. Any

legislation which may be enacted will be practically valueless unless it contains provisions specifically directed to this purpose and skilfully adapted to accomplishing it. The greatest danger in the present situation is not that the railways will not be returned to private operation, but that they will be returned to private operation under conditions and laws which will make successful private management impossible. If, in spite of the experience of the last ten years, and especially the last two years, Congress is not ready now to adopt legislation which will enable the railways to be successfully operated and developed under private ownership, the conclusion will have to be accepted that government ownership sooner or later is inevitable, and that it will be better to accept it sooner rather than later.

Cost of Reproduction in 1920

THE DIVISION OF VALUATION expects to complete its inventory of the railroads some time late in 1920, and judging by the preliminary reports on a few of the smaller roads which the division has made public, its final report to the Interstate Commerce Commission will consist essentially of figures regarding the cost of reproduction new, less depreciation, for each of the properties. The results presented thus far have been based on unit prices purported to be representative of conditions on June 30, 1914, and obtained in the main from an average of unit costs of work done during the five years 1910 to 1914, inclusive. Presumably these 1914 prices were selected because they afforded the latest information available at the inception of this momentous undertaking, and it has been contended that these same prices should, in fairness, be applied to all properties alike, regardless of the time that the inventories are completed.

Just what significance is to be placed in 1920 on a cost of reproduction based on unit prices applicable in 1914, has not been made clear. Although the valuation act does not so state, it is to be presumed that the data accumulated by the Division of Valuation are to be used for the placing of a physical valuation on the railroads, and if a valuation so determined is to serve any useful purpose it must be based on evidence admissible at the time that the valuation is to be used. In other words, any estimate cost of reproducing a property new on a given date must be obtained by applying to the inventory quantities unit prices that are typical at that date. Unit prices selected in 1914, except as they represented the latest information available at the time the valuation work was started, will have no more real relation to the cost of reproduction in 1920 than the prices of 1904, or 1894, or any earlier year that might be arbitrarily selected.

Had there been no radical change in price levels in the years subsequent to 1914 this question would be of no particular importance, but actually there has been a most profound change. Four years of the European war have produced such an inflation of currency and other changes that the wages of labor and prices of many commodities probably average close to 100 per cent higher than in 1914, and economists hold out scant hope for any appreciable reductions from the present levels. In the words of Professor Irving Fisher of Yale University, "To talk reverently of 1913-14 prices is to speak a dead language today."

Notwithstanding these considerations, there are current references to a value of the railway properties of the United States in the neighborhood of seventeen billion dollars—a figure obviously based on past costs—whereas the use of present unit costs of labor and materials probably would produce a valuation fully 50 per cent higher than those of 1914. This must of necessity be the case if cost of reproduction, the only real fruit of the valuation division's labors, is to be a prime factor in placing a valuation on the carriers.

This experience in the evaluation of the railroad properties has been a most illuminating object lesson regarding the use

of cost of reproduction as the principal factor in valuation. In five years' time, on the basis of cost of reproduction, the railroads have increased enormously in physical value—at least \$5,000,000,000 and probably much more—while their net earnings have woefully decreased. With continuing high prices the physical valuation would be maintained on the high basis due to high cost of reproduction, while with varying unit costs it would fluctuate up or down, and in a manner entirely independent of earning capacity. Of what use can such a valuation be in the establishment of rates? A valuation based on present unit costs certainly would not amount to less than \$22,000,000,000, while the book cost of road and equipment of the carriers is only about \$18,000,000,000, and their net capitalization only about \$17,000,000,000.

If the public still insists on basing rates on valuation and on basing valuation mainly on the cost of reproduction of the properties, the railway owners will hardly object, since the result would be to make the rates and net earnings far higher than any railway manager ever had the temerity to suggest. Spokesmen of the railways are modestly suggesting that the book cost of road and equipment be used as the basis for regulating future rates and earnings. The public would better accept this basis than go on with its valuation; for if the valuation is not used all the money spent in making it will be wasted; while if, as apparently is intended, the valuation is based chiefly on cost of reproduction, and if, as apparently must be done, up-to-date unit costs must be used, the valuation will be so enormous that its use as a basis for regulating rates and earnings would cost the public more than any other basis that could be used.

Lehigh Valley

THE RESULTS of federal operation of the Lehigh Valley in 1918 were remarkably good. Total operating revenues amounted to \$65,587,000, an increase of \$12,228,000 over the previous year. Operating expenses amounted to \$57,346,000, an increase of \$15,520,000. This left, after the payment of rentals, etc., net income of \$6,821,000, a decrease of \$2,867,000, as compared with 1917. The government guarantee to the owning corporation is \$11,321,000. To say that the results of operation were good when the government fell behind earning the rental which it had to pay by \$4,500,000, seems rather a contradiction, but the totals of operating expenses and net revenue do not tell the whole story.

The total tonnage of all freight carried one mile amounted to 7,138,000,000 in 1918, an increase of 474,000,000 ton miles, or 7.11 per cent over the previous year. Nearly the entire increase was due to a greater tonnage of merchandise freight carried. The ton mileage of merchandise freight amounted to 4,033,000,000 in 1918, an increase of 12.65 per cent over the previous year. The revenue passengers carried totaled 7,630,000 in 1918, an increase of 6.91 per cent over the previous year, and since the average passenger journey was nearly 4 per cent longer, the passengers carried one mile totaled 270,000,000 in 1918, an increase of 10.85 per cent.

Transportation expenses, the out-of-pocket cost of moving the business, amounted to \$30,010,000, an increase of \$6,667,000, or between 28 and 29 per cent. Taking into consideration the increase in wages, this is not a particularly large increase in transportation expenses, even had the volume of business remained the same in the two years.

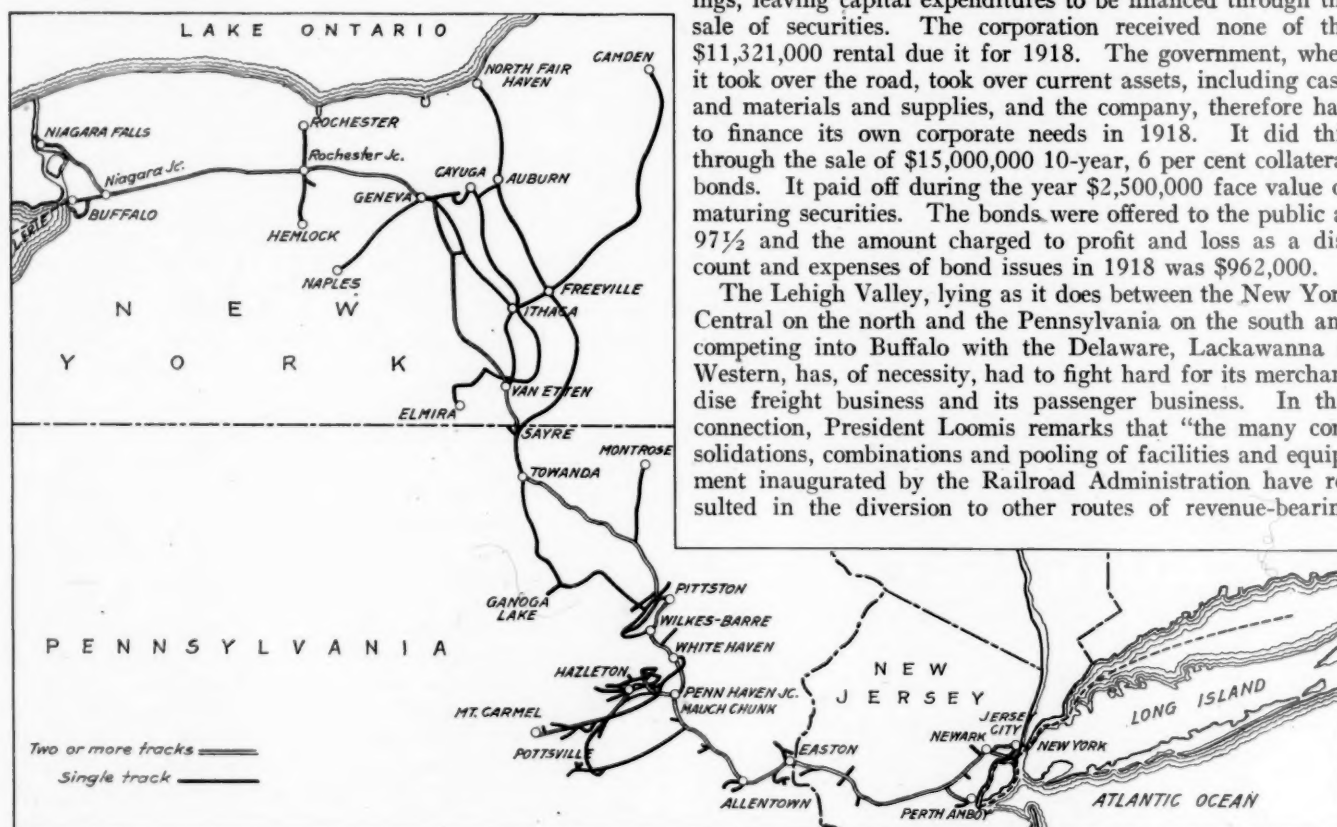
With an increase, however, of more than 7 per cent in the ton mileage of freight, revenue freight train miles totaled but 7,583,000 in 1918, a decrease of 10.25 per cent. The average train load, including company freight, was 920 tons in 1918, an increase of 143 tons, or more than 18 per cent over 1917. Traffic was not as well balanced in 1918 as in 1917, the percentage of loaded car mileage to total car mileage being 66.92 in 1918 and 68.65 in 1917. There was a large

gain in average car loading, the average number of tons of all freight per loaded car being 32.97 in 1918, comparing with 29.10 in 1917, a gain of 13.30 per cent. There was an increase in tonnage of anthracite and bituminous coal carried, the total tonnage of bituminous in 1918 being 4,726,000 tons and in 1917 3,785,000 tons and the total for anthracite being 15,523,000 in 1918 and 14,917,000 in 1917. The percentage of the total tonnage furnished by the different classes of commodities remained about the same; there was a slightly smaller proportion of anthracite, but this was balanced by a larger proportion of bituminous coal. As noted above, the ton mileage of merchandise freight increased very much more than the ton mileage of coal; the Lehigh Valley therefore evidently got a shorter haul on its coal in 1918 than in 1917, due probably to the effect of the zone system order, and got a much longer haul on the average on its merchandise freight. Under the zone order, the markets of the various coal mines

that the company has a larger equipment for its gross business and per mile of road, with one exception (as to per mile of road) than any other railroad in the eastern territory. It is a fact that the Lehigh Valley was one of the few coal roads in the eastern territory which was able to supply during the entire year 1917 a full quota of cars to its mine operators. This, of itself, is strong evidence of the amplitude of its car supply, and, with the falling off in output of both bituminous coal and anthracite that has taken place in 1918 and threatens to extend far into 1919, it is not strange that the Lehigh Valley stockholders hesitate to take on a capital charge of nearly \$10,000,000 for equipment which the government thought it was going to need.

The Lehigh Valley is in strongly competitive territory. It has been a particularly conservatively managed road for many years, although its 10 per cent dividends absorbed in the years prior to 1918 nearly the entire amount of surplus earnings, leaving capital expenditures to be financed through the sale of securities. The corporation received none of the \$11,321,000 rental due it for 1918. The government, when it took over the road, took over current assets, including cash and materials and supplies, and the company, therefore had to finance its own corporate needs in 1918. It did this through the sale of \$15,000,000 10-year, 6 per cent collateral bonds. It paid off during the year \$2,500,000 face value of maturing securities. The bonds were offered to the public at 97½ and the amount charged to profit and loss as a discount and expenses of bond issues in 1918 was \$962,000.

The Lehigh Valley, lying as it does between the New York Central on the north and the Pennsylvania on the south and competing into Buffalo with the Delaware, Lackawanna & Western, has, of necessity, had to fight hard for its merchandise freight business and its passenger business. In this connection, President Loomis remarks that "the many consolidations, combinations and pooling of facilities and equipment inaugurated by the Railroad Administration have resulted in the diversion to other routes of revenue-bearing



The Lehigh Valley

were restricted to territory situated within a comparatively short haul of the mine.

In 1917, 52 freight locomotives were bought and 23 ten-wheel freight locomotives and 10 Pacific type locomotives were rebuilt. A part, therefore, of the remarkably good showing made in heavier train load may be credited to the new and heavier locomotives.

The federal administration spent \$7,818,000 for maintenance of way in 1918, comparing with \$5,353,000 spent in 1917; and the administration spent \$17,004,000 for maintenance of equipment in 1918, as against \$10,000,000 spent in 1917. This increase in maintenance of equipment costs looks exceedingly large.

The administration assigned 1,000 box cars, 1,300 coal cars, 500 low-side gondola cars, and 500 drop-bottom gondolas to the Lehigh, but the company has refused to accept this equipment, the cost of which is \$9,648,000. As President E. E. Loomis points out in his annual report to stockholders, 98 per cent of the freight cars of the Lehigh Valley are steel or steel underframe. President Loomis says

traffic which your company had enjoyed."

The following table shows the principal figures for operation of the property under federal management. This is not the income account of the corporation.

	1918	1917
Mileage operated	1,441	1,443
Anthracite freight revenue.....	\$21,225,341	\$18,201,495
Bituminous coal freight revenue.....	2,892,992	2,200,731
Merchandise freight revenue.....	29,155,590	22,705,556
Passenger revenue	6,234,935	4,894,990
Total operating revenues.....	65,586,769	53,358,446
Maintenance of way and structures...	7,818,030	5,353,466
Maintenance of equipment.....	17,004,251	9,999,610
Traffic expenses	654,982	1,013,395
Transportation expenses	30,009,870	23,343,165
Total operating expenses.....	57,346,025	41,826,166
Taxes	1,874,237	1,953,954
Operating income	6,364,382	9,575,996
Net income	6,821,130	9,688,471

CORPORATE INCOME ACCOUNT	
	1918
Rental from government.....	\$11,321,233*
Other corporate income.....	3,026,425
Gross income	14,347,658
Interest and rentals.....	7,754,824
Net income	6,592,834
Dividends	6,060,800
Surplus	532,034

*No part of this rental had, up to the close of 1918, been received from the government.

End of Year Set for Return of Railroads

President Says They Will Be Handed Back to Owners and Congress Prepares for Permanent Legislation

WASHINGTON, D. C.

THE FLAT STATEMENT made by President Wilson in his message to Congress on Tuesday that "the railroads will be handed back to their owners at the end of the calendar year," creates at least one factor of certainty in the complicated railroad situation that has been lacking since December 26, 1917. The President spoke specifically and with authority because he is authorized by the federal control law to relinquish the roads "at any time he shall deem such action needful or desirable," although Congress could take away that power if it felt that more time should be allowed to work out its legislative solution.

While December 31 has been the date most commonly assumed for the termination of federal operation of the railroads, there have been some fears that the time of the transfer back to corporate control might be made dependent upon the degree of success attained by Congress in its efforts to enact legislation for the future regulation of the roads, and that the period of debate might thus be prolonged to extend into next year.

The President's statement, therefore, serves notice upon Congress, unless circumstances should be allowed to change his mind, or unless Congress should change the present law, that there is a time limit upon its endeavors if it is to act in season to accomplish the desired result of placing the country's transportation system on a secure foundation. It should also serve to induce some conservation of breath and words on the part of those who are inclined to wax rhetorical in demanding the return of private management without offering practical suggestions as to the conditions under which the companies are to be allowed to operate. The practical question is no longer "Shall the roads be returned?" or "When will they be turned back?" but, "How shall the transfer be effected with the least disturbance to the economic welfare of the country?"

The telegraph and telephone lines "will, of course, be returned to their owners as soon as the transfer can be made without administrative confusion," the President said; adding that if he were in immediate contact with the administrative questions which must govern the transfer he could name the date for their return also. Meanwhile he only suggested that in the case of the wire systems, "as in the case of the railways," it is "clearly desirable in the public interest that some legislation should be considered which may tend to make of these indispensable instrumentalities of our modern life a uniform and co-ordinated system which will afford those who use them as complete and certain means of communication with all parts of the country as has so long been afforded by the postal system of the government, and at rates as uniform and intelligible."

The President gave no further details of his ideas regarding the railroad situation, saying he hesitated to venture any opinion with regard to domestic legislation while out of daily touch with the problems, but in his latest previous statement on the subject, in his message to Congress in December, he said that the one conclusion he was ready to state with confidence was that "it would be a disservice alike to the country and to the owners of the railroads to return to the old conditions unmodified," because "those are conditions of restraint without development. There is nothing affirmative or helpful about them." As a general agreement with this sentiment has been expressed both within Congress and elsewhere, attention is now directed to the form of the modifications to be made in the old conditions, as the result

of the efforts of those of both conservative and radical views which will be brought to bear on the subject.

The President's statement may also be regarded as placing a definite period to the idea of an experiment with government operation, which, while ostensibly not a part of the purpose for which the railroads were taken over, was undoubtedly an active element in the celebrations of some of the men placed in charge of the transportation system last year. As a practical matter the experiment was ended when Congress tabled Mr. McAdoo's proposal for a five-year extension of government operation, which was then said to have been approved by the President. Mr. Hines, upon succeeding Mr. McAdoo in the office of director general, took up and supported for a time the ideas of his former chief as to the desirability of a further test of government operation, but he has not manifested any tendency to cry about spilt milk since it was made apparent that the public was not receptive toward the five-year plan. He has rather turned his attention to the complicated problems immediately before him and to formulating suggestions for a permanent reorganization of the railroads under private management. The transfer of the activities of the Railroad Administration from experimentation to the work of restoration and readjustment has been very perceptible and there has been more "railroading at home."

Announcement of a definite date for the return of the railroads brought great joy to many, if not most, of the railroad officers in the Railroad Administration organization, who have long been anxious for the opportunity to return to their homes and to their old jobs. While some may feel the loss of their present authority or may regret the passage of the opportunities for carrying out their ideas which operation of the roads as a single system afforded, most of them give an impression that they share in the feelings of the soldier who was more than willing to make any sacrifice for his country, but who wanted his discharge mighty quick after the armistice was signed.

Some of the members of the organization who are not railroad men may feel differently about the matter, because many of them are holding bigger jobs and receiving better pay than they ever have before. This is not true of most of the railroad men, and even when exercising a higher degree of authority, some of them have felt a certain circumscription while serving as parts of the huge governmental machine which they did not feel in their former positions.

The Republican leaders showed no disposition to quarrel with the President's announcement that he would return the roads. Senator Cummins expressed confidence that a bill could be passed before the end of the year but he predicted that if the bill is not passed by that time the roads would not be returned without legislation.

Chambers of commerce, boards of trade, and state legislatures and commissions are also expected to rejoice in the prospect of a return of the roads, but there is reason to believe that some of them are inspired by a desire to get the roads out into the open, from behind the protection of the federal control law, where they can get at them once more.

The Sixty-sixth Congress assembled in extra session on Monday, May 19, and after the preliminaries of organization prepared to take up as speedily as possible the appropriation bills which failed at the last session, including the appropriation for an additional revolving fund for the Railroad Administration to meet its deficit and to enable it to

assist the railroads in financing capital expenditures. Instead of the \$750,000,000 asked at the last session, the amount now required is estimated at over a billion dollars. While permanent railroad legislation is expected to take a prominent part in the activities of the session, the railroad question will first come up in connection with the appropriation bill.

Chairman Good of the House appropriations committee, promptly called a meeting to consider the general deficiency bill, in which the railroad appropriation was included at the last session and it is understood there will be a separate bill covering the railroad requirements, but Director General Hines has not yet submitted his estimate. Appropriations for the Interstate Commerce Commission and for the Alaska railroad are also to be passed upon.

The interstate commerce committees of both the House and the Senate are planning to take up the subject of permanent railroad legislation as early as possible, but no dates for hearings have yet been announced. Representative Sims reintroduced his former bill to extend the period of federal control until 1924.

A conference of the Republican members of the House adopted a legislative program which promised early consideration of the return of the telephone, telegraph and cable lines to their owners, and also of "railway legislation and development of transportation facilities."

Senator A. B. Cummins of Iowa, who was also elected president pro tempore of the Senate, has been selected as chairman of the committee on interstate commerce, and J. J. Esch of Wisconsin was made chairman of the House committee on interstate and foreign commerce. The other Republican members of the House committee are: E. L. Hamilton, Michigan; Samuel E. Winslow, Massachusetts; James S. Parker, New York; Burton E. Sweet, Iowa; Walter R. Stiness, Rhode Island; John G. Cooper, Ohio; Henry W. Watson, Pennsylvania; F. F. Ellsworth, Minnesota; E. E. Denison, Illinois; Everett Sanders, Indiana; Schuyler Merritt, Connecticut, and J. S. Webster, Washington. Mr. Esch has prepared a comprehensive railroad bill, amplifying the provisions of a bill he introduced at the last session, which represents in general the ideas of the Interstate Commerce Commission. He expects to introduce it probably by next week.

One of the first measures introduced was a resolution providing for a return of the wire systems to their owners and definite action on that subject is likely to precede the more complicated question of the disposition of the railroads.

A number of bills dealing with the railroad question have already been introduced but in most cases they represent the reintroduction of bills presented at the last session. Senator King introduced a bill, S. 31, to repeal the federal valuation act. S. 67, introduced by Senator Thomas, provides for the creation of federal railroad companies and is intended to establish more effective supervision of railroads. Senator Gronna introduced a bill, S. 113, providing for reduced rates for the transportation of laborers when traveling under the direction and control of the Department of Labor. Senator Poindexter re-introduced as S. 360 his proposed amendment to Section 4 of the commerce act to provide a rigid long and short haul clause; also a bill, S. 361, to provide for the regulation of security issues. Several bills were introduced to repeal the Daylight Saving law.

Senator Gronna of South Dakota filed resolutions adopted by the South Dakota legislature petitioning for additional passenger service in the state and also urging Congress to enact legislation necessary to authorize the continuance of government control for five years. Senator Myers of Montana presented a petition from the Montana legislature urging the prompt return of the railroads and also urging an inquiry as to the possibility of additional railroad construction in Carter County.

Transportation Must Be

Put on Sound Basis

THOMAS DEWITT CUYLER, chairman of the Association of Railway Executives, in commenting upon the President's statement to Congress that the railroads would be returned to owners at the end of this year, said:

"It is to be assumed, of course, that the President believes that Congress will be able to frame in the next seven months the legislation that it will be necessary to enact before the government returns the roads to their owners. The members of the Senate and House who have this legislation in charge are apparently hopeful that, with the unmistakable general agreement over the country as to the basic principles of necessary railroad legislation, a non-partisan bill, embodying these principles, can be placed in the President's hands for his signature within the next few months.

"To return the railroads to their owners under the old system of regulation—a system that had failed—would invite disaster. As Senator Cummins has so well expressed it, this is the psychological time to correct the evils in our pre-war system of railroad control.

"The problem of putting our transportation system on a sound basis for the future is not nearly so complex as it seemed two or three years ago. The public demands, first, adequate, efficient, safe transportation, economically produced—second, new railroad facilities and improvements to meet the needs of a growing country, without wasteful or unnecessary construction; third, fair wages and working conditions for employees, with insurance against a paralysis of the railroads by strikes.

"In order that these public needs may be met by the railroads when they are returned to private management, certain things are indispensable: First, a continuous investment of new capital for additions and betterments, from \$750,000,000 to a billion dollars a year; second, rates for carrying freight and passengers that will pay for the labor and material consumed in operation, and that will provide a fair return on the value of the property devoted to the public use—that is, an income on the capital that will attract the necessary new capital; third, responsible regulation by the national government that will protect the interests alike of the owners, the workers and the general public.

"The legislation to make these things possible, and to insure the future growth of our transportation facilities, does not have to be very complicated. On most of the principles involved there is a general understanding and agreement over the country, and the honest differences of opinion are mainly as to details. But this certainly is the time to lay a sure foundation for the future, and to perform the same public service for our transportation system as was performed seven years ago by Congress for the banking system.



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Repatriated Armenians

Railway Stockholders: December 31, 1917

Total of 647,689 Understates Number of Individuals Who
Have Interest in Financial Ownership

THE BUREAU OF RAILWAY ECONOMICS has issued Bulletin No. 140, giving statistics regarding railway stockholders as of December 31, 1917. In Bulletin No. 94 the bureau gave a compilation of the number of holdings of railway stockholders on June 30, 1915. A similar compilation was prepared by the bureau as of December 31, 1916, but publication was held up by the war. The present bulletin not only incorporates the unpublished data for 1916, but brings the record down to December 31, 1917.

This bulletin is based on reports to the commission of operating and non-operating companies of all classes, except switching and terminal companies. The statistics are virtually complete for each class, although it has been necessary to omit a few of the smaller roads that filed incomplete returns or no returns at all. Such omissions are so unimportant as to be virtually negligible for practical and comparative purposes.

Railway stockholders numbered 647,689 on December 31, 1917, as compared with 612,880 on December 31, 1916, and 626,122 on June 30, 1915. This covers the steam railways of the United States, operating in 1917 259,485 miles of line. The average holdings per stockholder, par value, amounted to \$13,966 in 1917, as compared with \$14,321 in 1916 and \$13,796 in 1915.

The foregoing statements apply to all roads. For roads of Class I and Class II, operating 250,804 miles (96.6 per cent of the total), it is possible to exclude to a considerable extent capital stock held by or for other railway companies. Making this exclusion, the approximate amount of railway stock in the hands of the general public on December 31, 1917, was \$6,377,551,082. The number of holders of this net stock was 636,208, and the average amount of their holdings \$10,024. The corresponding returns for 1916 were \$6,202,673,485 of net capital stock, 600,671 stockholders, and average holdings of \$10,326; for 1915, \$6,004,496,162 of net capital stock 607,630 stockholders, and average holdings of \$9,882.

Table I shows the number of roads, operated mileage, and total number of stockholders on December 31, 1917, grouped by class and district.

TABLE I
NUMBER OF STOCKHOLDERS
Railways of the United States, December 31, 1917

Class and District	Number of roads	Miles of line operated	Number of stockholders
All classes:			
United States.....	1,272	259,485	647,689
Eastern District.....	534	64,829	340,586
Southern District.....	275	50,378	58,301
Western District.....	463	144,278	248,802
Class I (operat. and non-operat.):			
United States.....	572	232,798	627,930
Eastern District.....	333	59,089	332,624
Southern District.....	78	42,852	53,226
Western District.....	161	130,857	242,080
Class II (operat. and non-operat.):			
United States.....	272	18,006	8,947
Eastern District.....	88	4,067	3,470
Southern District.....	62	4,650	2,659
Western District.....	122	9,289	2,818
Class III (operat. and non-operat.):			
United States.....	428	8,681	10,812
Eastern District.....	113	1,673	4,492
Southern District.....	135	2,876	2,416
Western District.....	180	4,132	3,904

It should be borne in mind that the number of stockholders shown in Table I is the number of distinct holdings of stock, and does not necessarily represent the number of separate individual owners. On the one hand, the aggregate contains duplications arising from the fact that a person may own stock in two or more railway companies; on the other

hand, and of much greater significance, blocks of stock are often held in trust for multiple beneficiaries, or are held as investments by banks, insurance companies, and educational, benevolent, or other institutions in which many individuals have an interest, although not directly.

The Interstate Commerce Commission recently issued a statement giving the number of stockholders as 627,930, but this covered only 572 Class I roads and their non-operating subsidiaries. The commission also gave an analysis of the 20 largest holders in each road, aggregating 8,301 names, holding 50,873,322 shares, without regard to whether they were \$50 or \$100 shares, from which it drew the conclusion that stock ownership is largely concentrated in a few holdings. This point is further analyzed in the bureau's bulletin to show that while this is a fact the large holdings represent the interest of many individuals. On this point the bulletin says:

"To say that there were 647,689 railway stockholders in 1917 is therefore very much to understate the total number of individuals who had a direct or indirect interest in the financial status of the railways, and in the equities represented by railway ownership. This fact is strikingly brought out in a statement recently issued by the Interstate Commerce Commission, showing that 8,301 out of the 627,930 stockholders of railways of Class I held about one-half the outstanding stock of those railways. At first sight this appears to indicate great concentration of railway stock in the hands of a relatively small number of holders, but further analysis shows that more than five-sixths of the total number of shares held by the 8,301 large stockholders were in the hands of railway and other corporations, voting trustees, and estates, the remaining shares being individual holdings. These individual holdings comprised 8.2 per cent of the total number of shares outstanding. It may safely be assumed that the great bulk, if not the whole, of the stock held by corporations, trustees, and estates represented the kind of holdings described above, namely, blocks held in trust or for corporate investment, in which many individuals had an indirect interest. In the light of this analysis, the seeming concentration of railway stock in the hands of a few individual holders is largely contradicted by the actual fact that only 8 per cent of the total outstanding stock is concentrated in large individual holdings, while the remaining 92 per cent is distributed among hundreds of thousands of small holdings, or is held in trust for, or for the benefit of, many millions of individuals."

There were 847 operating roads, with 560,621 stockholders, and 425 non-operating companies, with 87,068 stockholders. The number of stockholders per company averaged 509.

Holdings Per Stockholder

Table II shows the par value of gross capital stock outstanding on December 31, 1917, the total number of stockholders, and the average amount of stock per stockholder.

The capital stock of the Eastern railways represented \$3,559,686,211, or 39.4 per cent of the total; of the Southern railways \$1,203,202,068, or 13.3 per cent; of the Western railways \$4,282,543,530, or 47.3 per cent.

As in earlier years, the average holdings for railway companies of Class II were considerably larger throughout than those for Class I. This was due to the relatively small number of stockholders per company, a considerable number of companies of this class being controlled by other corporations and their stock being held in large blocks. The same thing

is true of companies of Class III, but the comparatively low capitalization per company results in a small average holding per stockholder. In the case of many controlled railway companies, the number of stockholders on their books is the sum of the number of directors (holding one qualifying share of stock each) and the controlling corporation.

TABLE II
AVERAGE HOLDINGS PER STOCKHOLDER
Railways of the United States, December 31, 1917

Class and District	Capital stock outstanding, par value	Number of stockholders	Average amount of stock per stockholder
All classes:			
United States.....	\$9,045,431,809	647,689	\$13,966
Eastern District.....	3,559,686,211	340,586	10,452
Southern District.....	1,203,202,068	58,301	20,638
Western District.....	4,282,543,530	248,802	17,213
Class I (operat. and non-operat.):			
United States.....	8,663,190,028	627,930	13,701
Eastern District.....	3,433,734,454	332,624	10,323
Southern District.....	1,089,848,118	53,226	20,476
Western District.....	4,079,607,456	242,080	16,852
Class II (operat. and non-operat.):			
United States.....	335,471,297	8,947	37,495
Eastern District.....	107,702,407	3,470	31,038
Southern District.....	80,707,610	2,659	30,353
Western District.....	147,061,280	2,818	52,186
Class III (operat. and non-operat.):			
United States.....	106,770,484	10,812	9,875
Eastern District.....	18,249,350	4,492	4,063
Southern District.....	32,646,340	2,416	13,513
Western District.....	55,874,794	3,904	14,312

To obviate the duplications resulting from intercorporate holdings, Table III eliminates them as far as practicable.

Since 1915 the Interstate Commerce Commission has required roads of Classes I and II to report the names and holdings of their 20 largest stockholders. Generally speaking, wherever one railway company has a controlling interest in another railway company through stock ownership, its name will appear in the list of the twenty largest stockholders of the controlled company. By eliminating such holders and their holdings, so far as they may be railway companies or trustees holding for railway companies, it is possible roughly to approximate the amount of stock held by the public, and the number of stockholders owning such stock. The result

Deducting from the aggregate amount of stock and number of stockholders, respectively, the \$2,561,110,243 held by or for other railway companies, and the 669 railway companies by or for whom held, the approximate net amount of stock in the hands of the public becomes \$6,377,551,082, while the number of holders of net stock was 636,208. This reduces the average holding per stockholder to \$10,024. The corresponding average in the East was \$7,584, in the South \$16,543, and in the West \$11,886.

TABLE III
RAILWAY STOCK IN THE HANDS OF THE PUBLIC, DECEMBER 31, 1917
(Roads of Classes I and II, with annual operating revenues above \$100,000)

Item	United States	Eastern District	Southern District	Western District
Number of roads.....	844	421	140	283
Miles operated.....	250,804	63,156	47,502	140,146
Number of stockholders.....	636,877	336,094	55,885	244,898
Total stock outstanding.....	\$8,938,661,325	\$3,541,436,861	\$1,170,555,728	\$4,226,668,736
Average holding per stockholder.....	14,035	10,537	20,946	17,259
Held by or for railways:				
Number of railway holders.....	669	391	108	170
Amount of stock held.....	\$2,561,110,243	\$995,382,218	\$247,830,807	\$1,317,897,218
In hands of public:				
Number of stockholders.....	636,208	335,703	55,777	244,728
Amount of stock held.....	\$6,377,551,082	\$2,546,054,643	\$922,724,921	\$2,908,771,518
Average holding per stockholder.....	10,024	7,584	16,543	11,886

*Approximate.

Table IV compares the statistics of Tables I and II, all classes of roads for the United States combined, with corresponding statistics for December 31, 1916, and June 30, 1915. The statistics for 1915 are from Bureau of Railway Economics Bulletin 94, while those for 1916 are from hitherto unpublished tabulations.

Average holdings per stockholder were \$13,966 in 1917, compared with \$14,321 in 1916 and \$13,796 in 1915. The average for 1917 was lower than in 1916 by \$355, or 2.5 per

TABLE IV
COMPARATIVE STATISTICS: 1915, 1916, AND 1917
United States—all classes

Item	December, 31, 1917	December, 31, 1916	June 30, 1915	Increase or decrease, 1917 compared with			
				1916		1915	
				Amount	Per cent	Amount	Per cent
Miles operated.....	259,485	259,509	257,211				
Capital stock.....	\$9,045,431,809	\$8,777,052,011	\$8,638,286,892	\$268,379,798	3.1	\$407,144,917	4.7
Number of stockholders.....	647,689	612,880	626,122	34,809	5.7	21,567	3.4
Average holdings per stockholder.....	\$13,966	\$14,321	\$13,796	d 355	d 2.5	\$170	1.2

is only an approximation, as it necessarily can take no account of small holdings by railway companies, but a large part of the duplication due to intercorporate railway holdings can certainly be eliminated by the method outlined. Table III gives the results of such an elimination.

Railways of Classes I and II operated 250,804 miles of line on December 31, 1917, or 96.6 per cent of the total operated mileage on that date. Table III shows, first, the outstanding stock and total number of stockholders of railway companies of Classes I and II; second, the number of cases of stock held by or for other railway companies, reported as among the 20 largest holdings of each company's stock, and the amount of stock so held; deduction of railway holdings and number of stockholders from the total produces as a result, third, the stock in the hands of the public and the number of stockholders corresponding to such stock.

cent, but greater than in 1915 by \$170, or 1.2 per cent.

Table V reduces the comparative statistics of Table IV to the basis of stock in the hands of the public and the number of holders thereof. For the reasons already given above, the table applies only to companies of Classes I and II.

Capital stock in the hands of the public approximated \$6,377,551,082 in 1917, which was greater by \$174,877,597, or 2.8 per cent, than in 1916, and \$373,054,920, or 6.2 per cent, greater than in 1915. The number of stockholders was 636,208, which was greater by 35,537, or 5.9 per cent, than in 1916, and 28,578, or 4.7 per cent, greater than in 1915.

The average amount of net stock per stockholder was \$10,024 in 1917, compared with \$10,326 in 1916 and \$9,882 in 1915. This was a decrease of \$302, or 2.9 per cent, as compared with 1916, and an increase of \$142, or 1.4 per cent, as compared with 1915.

TABLE V
COMPARATIVE HOLDINGS IN THE HANDS OF THE PUBLIC, 1915, 1916, AND 1917 (APPROXIMATE)

Item	December, 31, 1917	December, 31, 1916	June 30, 1915	Increase or decrease, 1917 compared with			
				1916		1915	
				Amount	Per cent	Amount	Per cent
Miles operated.....	250,804	250,215	248,395				
Capital stock (net).....	\$6,377,551,082	\$6,202,673,485	\$6,004,496,162	\$174,877,597	2.8	\$373,054,920	6.2
Number of stockholders.....	636,208	600,671	607,630	35,537	5.9	28,578	4.7
Average holdings per stockholder.....	\$10,024	\$10,326	\$9,882	d \$302	d 2.9	\$142	1.4

The Heating and Ventilation of Engine Houses

A Detailed Exposition of Approved Methods of Application to
Either New or Old Structures

By T. W. Reynolds

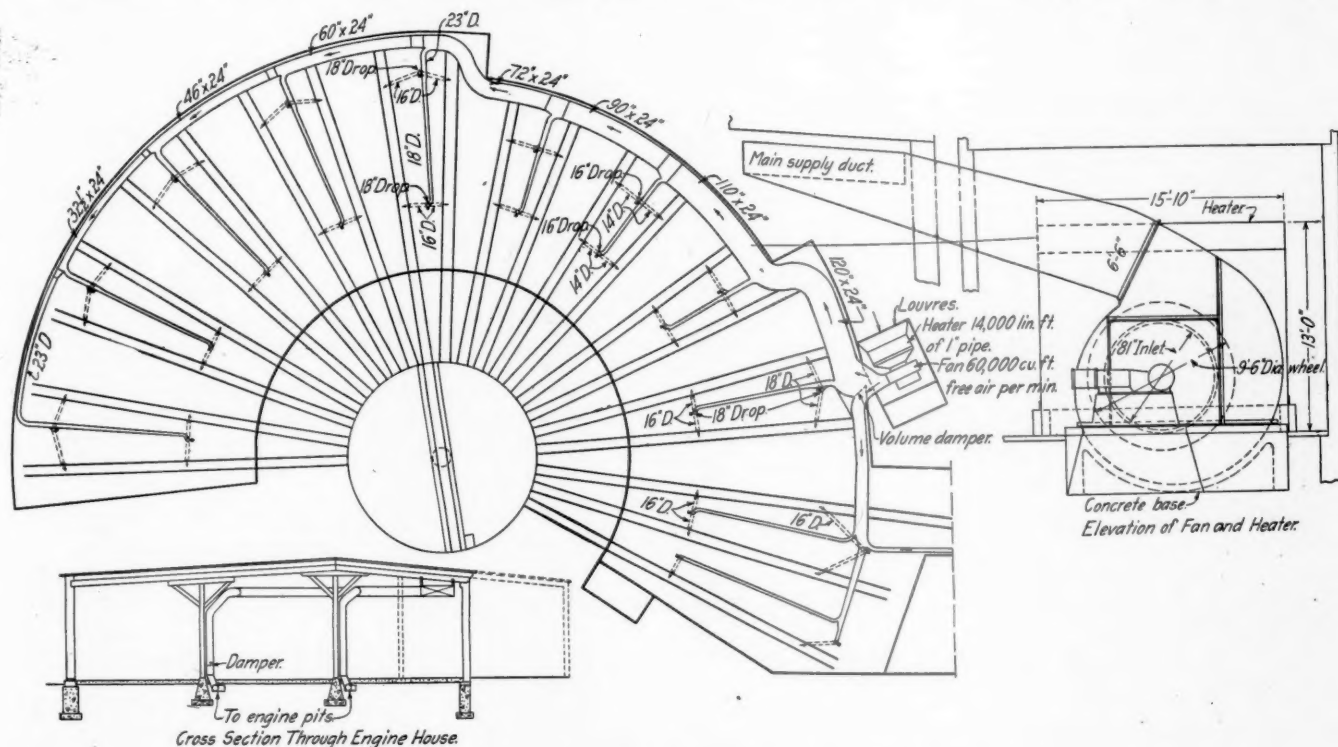
THE HEATING and ventilating of engine houses by means of air propelled by a steam driven fan, through adjustable louvres and heaters, and discharge ducts to the engine pits of the various stalls, is common practice. The ducts may be of concrete run under ground or of sheet metal carried overhead. The underground ducts are the more desirable and are the type generally provided in new structures, but in installing the system in old houses the cost of the underground duct is prohibitive.

This article discusses the use of underground concrete air ducts as applied to a new 30-stall engine house, having concrete floors and engine pits, brick walls and timber frame

and capacities of apparatus will be required; there being two similar sets of equal capacities, one of which is described.

Heaters: 16,500 lin. ft. of 1-in. wrought iron pipe in coils of the mitre type, arranged in two groups of five sections each, and having a free area through the coils of 80 sq. ft. The length of the shortest coil is 4 ft., longest 19 ft., height of heater 9 ft. 2 in., weight 49,500 lb., size of manifold connection 8 in., main return connection 3½ in.

Fans: three quarter housed bottom horizontal discharge, of the steel plate type, having a capacity of 80,000 cu. ft. of air per min. at ¾-oz. pressure per sq. in. 140 r. p. m. for the above capacity and 2,250 ft. per min. for the velocity of



Layout of a Heating System with Overhead Sheet Metal Ducts

and roof, but the use of ducts of sheet metal is also referred to. The cubical content of the house under discussion is 1,700,000 cu. ft.; the glass area is 10,000 sq. ft.; the exposed area of brick wall is 15,720 sq. ft.; and of wooden wall, 9,520 sq. ft.; the concrete floor area is 73,930 sq. ft.; the roof area is 57,730 sq. ft.; and the area of the yellow pine doors is 5,300 sq. ft.

The installation is to maintain an even temperature of 65 deg. F., when the temperature of the external air is -10 deg. F., and when fresh air only is supplied to the fans; and to have a capacity to change the entire contents of the house once every 12 min. The installation is also to keep the house free from fog and steam at all times. The temperature of 65 deg. is to be obtained after the doors have been closed five minutes, all temperatures being measured five feet above the floor.

For these average or typical conditions the following sizes

air at the fan outlet; size of the latter 78 in. by 66 in. with a fan inlet diameter of 94 in. The weight of the fan is 7,500 lb., diameter of the fan wheel 132 in., width of blade at inlet 63 in., and periphery, 54 in.

Engines: direct-connected 12 in. by 16 in. simple horizontal side crank of 45 i. h. p., having a throttle valve of 3½ in. size and exhaust outlet of 4½ in., set on a cast iron base 26 in. high, weight 6,650 lb., engine to operate with 80 lb. steam pressure.

Condensation return pumps: horizontal duplex, piston type, brass fitted, size 6 in. by 4 in. by 6 in. automatic hot water return pump with cast iron receiver in combination, designed to operate with a steam pressure of 80 lb. per sq. in. and a back pressure of 3 lb. or less.

The required boiler horse-power for both sets of engines, pumps and coils as above described is 390.

An arrangement of engine or motor direct connected to the

fan is preferable, flexibility and exact alinement being procured by means of a flexible coupling connecting the shafts of the engine or motor with that of the fan. Proper alinement is most important and may be obtained where care is used with simple flange couplings. Space conditions (where length is considered) make the direct connection the more desirable. Such an arrangement eliminates the loss due to slippage of belts and the cost of maintaining them, and is safer because of their elimination. The cost, however, is greater, since it is necessary to select larger engines or motors to obtain the same power at a less speed.

Belt drive is necessary where alternating current motors are used, since the available minimum speed is in excess of fan requirements. The fan and engine pulleys are placed on not less than 8-ft. centers. Where impossible to arrange for this distance a drive by means of the so-called silent chain may be used. The use of a motor requires a base of the sliding type adjusted from time to time by screws to conform with the stretching of the belt.

The most economical prime mover is the steam engine since it is possible to use the exhaust steam from the steam using machinery, such as the engines and pumps. By cross connection with like apparatus in the boiler and engine plants, the exhaust from all such units is made available at either the feed water heater or heater coils.

Arrangement of Blast Heaters

Blast heaters are indirect and may be of the all cast iron type, such as the Vento, or they may be constructed of pipes set in rows and staggered with ends screwed into cast iron sectional bases. Some manufacturers divide these bases by means of partitions into two compartments, one for steam, the other for air. Fewer difficulties are encountered with the mitre type of coil in the way of air binding. In these, the pipes run horizontal from the top of the coil and, fitted with 90 deg. ells, connect to the return base at the bottom of the coil. Pipe coils may be operated under atmospheric pressure and, where steam pressures in excess of 15 lb. must be used, they are particularly desirable. The horizontal pipes of the coils should have a slope of not less than $\frac{1}{4}$ in. in 10 ft. to drain them.

The steam pressure being less than that in the boilers, some mechanical means is required for returning the condensate to the boilers, a return pump being used for this purpose and the exhaust utilized in the heating system after passing through an oil separator.

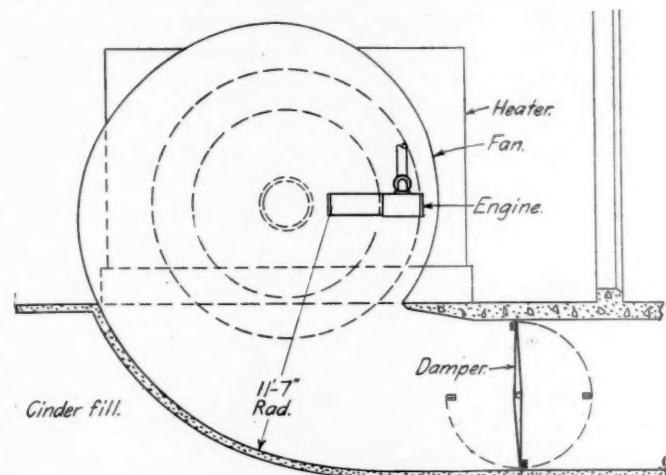
Design of Air Ducts

The heating requirements for an engine house are roughly and quickly determined by multiplying the total number of stalls by the average amount in square feet of radiation usually required per stall. Other requirements are a final temperature of 140 deg. for the air with a velocity of 600 ft. per min. at outlets, each pit having four outlets. Due to practical conditions of building construction, the widths of ducts are practically standard, the height being variable, as required, to obtain the necessary cross section.

Referring to the plan, a duct $6\frac{1}{2}$ ft. square is extended from each fan and connected into one having an area of 67 sq. ft. just inside the engine house. It is obvious that economy and a better distribution are furthered by the extension of this duct through the center of the house to its front wall, and then dividing and branching each way. Furthermore, it is often impossible to run these by any other method. Each of the two main branches is 7 ft. wide and about 34 sq. ft. in cross section, the branches and outlets to pits being 2 ft. 4 in. wide and 4.66 sq. ft. in area. Ducts are of concrete or of brick, smooth-finished on the inside. Those of smaller size may be of glazed sewer pipe installed in the usual manner.

Ventilation Augmented By Smoke Jacks

Ventilation is aided by the exhaust through smoke jacks from the stacks on locomotives. Some types of smoke jacks are made with horizontal and vertical adjustments so as to enshroud the locomotive stacks more completely, thereby carrying off all of the smoke and gases and avoiding the necessity for exact spotting of locomotives. There have been a few recent and successful installations in which the discharge from locomotive stacks is collected by means of ducts run above the roof. This is in addition to the ventilation system and necessitates an exhaustor which forces the smoke into a stack. Metal parts are avoided because of the sulphuric acid resulting from soot and water in combination, and a special type of non-corrosive fan is required. Should the fan at



Horizontal Bottom—Discharge Fan Used with Underground Concrete Ducts

any time be inoperative, the smoke jacks are arranged with bypasses, so that they may be discharged directly into the atmosphere. In general, these installations are provided where local laws make their use compulsory.

Course of the Ventilating Air

In the system of ventilation under description the air is discharged into the engine pits and assists in ridding the running gear of the locomotive from snow and ice quickly. The steam passes rapidly upward beyond the breathing zone and out of the smoke jacks, while the working level is maintained free of all objectionable smoke and gases.

The distribution of air to the various branch ducts is effected by means of volume deflectors. These consist essentially of a door made of a steel plate braced by angles and securely hinged to the duct, adjustments being made along a $\frac{3}{8}$ -in. by $1\frac{1}{4}$ -in. strap iron punched on $1\frac{1}{2}$ in. centers. When the pressure of air into each branch duct under normal working conditions is approximately the same the deflectors are permanently fastened into position. Operating and locking devices are also installed in the duct leading from each fan, and conveniently near the same, an adjustable damper. The damper is bottom heavy and comes to rest on angle stops. A stationary deflector or divider is also installed at the point where the main underground duct divides near the middle of the engine house. This deflector is constructed of No. 12 steel, bent to an easy radius and braced.

The heating and ventilation apparatus is divided into two equal sets which is an advantage in many ways and allows for a greater economy of operation. While the exhaust steam should be utilized in the heating system during the winter months, any excess may be used for heating the water of the locomotive boiler washout and reclaiming sys-

tem or for boiler feed water. An outboard exhaust pipe must be provided to carry off the exhaust steam in warm weather when it cannot be used in the heating system or otherwise. To regulate the back pressure carried on the engines a back-pressure valve is connected to this pipe, and from this point a line is extended through the roof with spiral riveted pipe, terminating in an exhaust head. This valve also holds the steam within the heating system when it cannot be used, automatically opening for the pressure set and releasing the exhaust steam through the exhaust head until the excess pressure has been discharged.

The Use of Sheet Metal Ducts

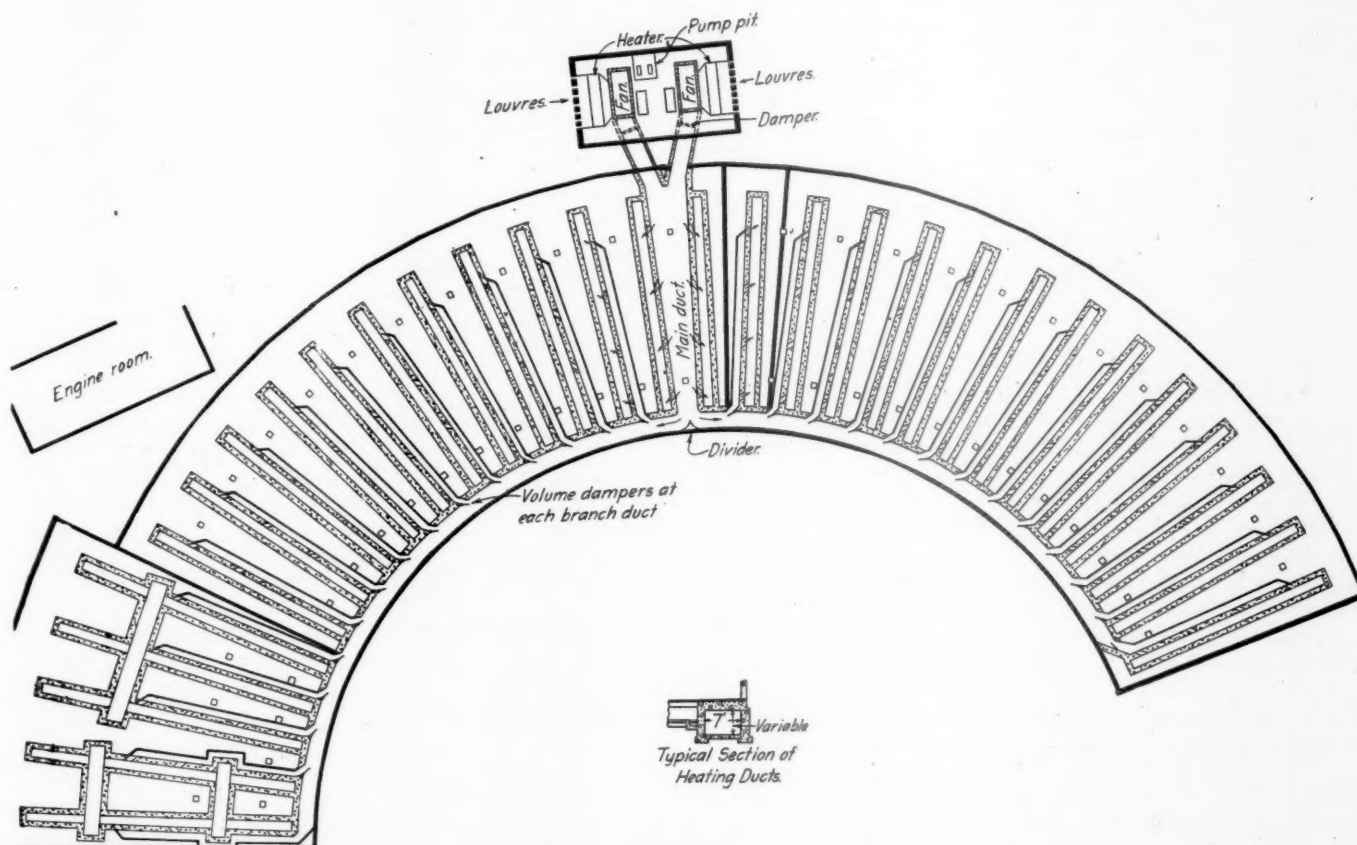
While concrete ducts are better, though requiring a greater expenditure in first cost, they are prohibitive through greatly increased costs, if applied to a house existing prior to its installation. Concrete ducts require but little or practically

should only be permitted where applied to an existing house.

As a practical illustration of an installation of sheet metal ducts, take the case of an old roundhouse originally built with 11 stalls to which in course of time an addition of 10 stalls was made, making 21 stalls in all. These were made of greater length to accommodate the increasing length of locomotives. Six of the original stalls were similarly lengthened and when it was decided to install a heating system a fan house was erected at the rear for housing the one set of indirect heating apparatus.

The sheet metal ducts were installed overhead. The trunk duct is rectangular in shape because of limited head-room, being run close along the rear wall so as to avoid coming in contact with stacks when locomotives are run too far forward.

Supports for the trunk duct are of two $\frac{1}{2}$ -in. rods secured to one $1\frac{1}{2}$ in. by $1\frac{1}{2}$ in. by $\frac{3}{16}$ in. angles passing under-



Layout of a Heating System with Underground Concrete Ducts

no maintenance, whereas with ducts of sheet metal renewals must be made from within one to two years from date of installation. The smoke and gases are the more conspicuous in the older type of houses, and the presence of moisture from the many locomotive safety valves combines with these to form sulphuric acid acting as would an accelerated test upon the light sheet metal.

The conditions are the worst for corrosion, alternate wetting and drying. Melting snow and ice on locomotives, along with the escape of steam greatly assist in this corrosion. This is more rapid at some points than at others, as, in accordance with the overhead building construction, the ducts may of necessity be run in locations near the safety valves and smoke stacks of the locomotives. The only advantage of sheet metal ducts is in their low first cost, the ease of construction and their adaptability to turns and transformations. The use of any kind of sheet metal ducts

neath the duct. Round ducts are supported by means of $\frac{3}{8}$ in. bent rods. The branches are taken off and run along the roof trusses, most of the branches having two down pipes. These are carried down at building uprights and are divided beneath the floor so as to serve the engine pits, each pit having two outlets.

Starting from the fan the main duct is divided into two branches, one 120 in. by 24 in., the other 56 in. by 24 in. the first having a ratio of five to one for length and depth, so that the friction losses are of course somewhat increased. Branch ducts are sized according to the cubature and the length of stall. They vary from 19 in. to 23 in. in diameter with down pipes, mainly of 18 in. diameter. The latter are divided into two 16 in. pipes and extended with rectangular shapes transforming to the 12 in. by 24 in. outlets in the pits. Down pipes in the machine shop terminate with open ends seven feet above the floor and are each fitted with

damper, quadrant and locking device; as are all others throughout the engine house.

Gages for the ducts are as follows:

Gages	Sizes, in. diam., for round shapes
26	3 to 12
24	13 to 24
22	25 to 34
20	35 to 50
18	51 up
Gages	For rectangular shapes, referring to width of greatest dimensions
26	3 to 18
24	19 to 24
22	25 to 36
20	37 to 72
18	73 up

It is necessary to protect the down pipes from mechanical injury. Failure to do so will soon result in bent and damaged ducts. A sheet metal shield of heavy gage is fitted snugly around each down pipe for a distance of five feet above the floor and secured by $\frac{1}{4}$ in. bolts at the front and at the rear by 4 in. lag screws to the posts, bolts and screws being on 10-in. centers. The space between the pipe and the shield is grouted for 3 in. above the floor line and sloped so as to drain to the post. Shields are painted two coats inside and outside before erection.

The screens which are fitted to openings at the duct outlets in engine pits are made up of an angle iron frame with corner plates which encloses a screen of 2 in. mesh No. 11 B. W. G. galvanized poultry wire. Of late these screens have been constructed of locomotive wire mesh, since the ordinary wire quickly deteriorates and in a short time totally disappears.

Standard Time Zones Modified

THE Interstate Commerce Commission has issued a supplemental report modifying its original order prescribing the boundaries of standard time zones, as reported in the *Railway Age* of November 22, 1918, page 917, and September 13, 1918, page 525. Changes are made in the boundaries between eastern and central time, in Ohio, to meet complaints from various towns, and similar changes between the 90th and 105th meridians to meet the wishes of certain towns in Montana, all to take effect June 1, at 2 A. M.

The Hocking Valley, the Toledo & Ohio Central, the Kanawha & Michigan and the Pennsylvania, have various joint track arrangements, covering in all many miles, which make it essential that the Hocking Valley south of Columbus, the Toledo & Ohio Central between Columbus and Corning, the Pennsylvania between Bremen and New Lexington, and the Kanawha & Michigan between Corning and Charlestown, be operated under the same standard time. To do this, and to best accommodate commerce, the order now puts the four roads first named in the central time zone. The Kanawha & Michigan will, under this order, use central time to Gauley Bridge, W. Va., but will be required in eastern territory to use eastern time on its public time-tables and announcements.

When the daylight saving law went into effect, in March, numerous towns in Ohio left their clocks unchanged, thereby virtually taking themselves out of the eastern zone and placing themselves within the central zone. These towns, located on the boundary line are allowed to consider themselves within the central zone; they are Bellevue, Monroeville, Plymouth, Shelby, Mansfield, Butler, Mount Vernon, Chicago Junction, Utica and Galion. Requests from places further east are denied.

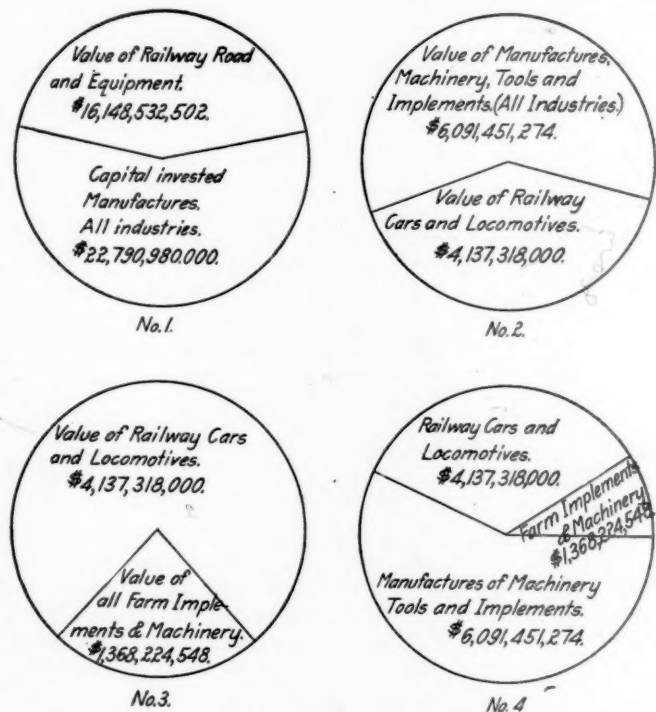
The city of Toledo, as represented by the Toledo Commerce Club, requested to be changed from the central to the eastern zone; but the commission finds that the citizens are unable to agree among themselves, and the petition is denied. The New York Central and the Wheeling & Lake Erie, using

eastern time at Toledo, are permitted to continue so, but public time-tables must show arrivals and departures with reference to central time. At Albany, Ga., the use of central time has already been authorized.

In Helena, Butte, Deer Lodge, Missoula, and other places in western Montana, the citizens have never observed Pacific time, as prescribed by the commission, and the whole state of Montana will now be allowed to use Mountain time. The Great Northern, however, will be allowed to use Pacific time as far east as Troy, Mont., and the Northern Pacific as far east as Paradise, Mont. Corresponding changes will be made on the Milwaukee road.

Value of Railway Plant Compared with That of Other Industry

THE ACCOMPANYING ILLUSTRATIONS were prepared by E. B. Leigh, president of the Chicago Railway Equipment Company, for the purpose of showing clearly the value represented by the railway plant of the United States as compared with that represented by the investment in manufacturing industries generally; also the value of railway locomotives and cars only as compared with the value of the machinery, tools and implements used in all



Comparative Value of Railway Plant and Equipment

manufacturing industries; and also the value of locomotives and cars as compared with that of all agricultural machinery, tools and implements. Mr. Leigh's specific purpose was to emphasize the large purchases which are or ought to be made by the railways as compared with other industries.

The statistics on which the illustrations are based were taken from the United States Census report for the year 1914, the latest official compilation which gives comparable data. They were first used in graphic form by Mr. Leigh in an address, entitled "Railway Buying and Industrial Readjustment," which was delivered at the recent business conference held under the joint auspices of the Beloit (Wis.) Chamber of Commerce and Beloit College. The essential features of Mr. Leigh's address were published under the same general heading in the *Railway Age* of April 4.

Fuel Association Holds Eleventh Annual Convention

Tackles Fuel Conservation Problem in a Big Way From Both Operating and Mechanical Standpoints

WITH AN ATTENDANCE rivaling that at the memorable convention of last year, the International Railway Fuel Association opened its eleventh annual meeting on Monday at the Hotel Sherman, Chicago.

Address of President L. R. Pyle

Mr. Pyle in his opening address made a plea for economy in fuel during the period of reconstruction. He spoke in part as follows: Those who have not had a practical working knowledge of the conditions under which the railroads labored during the past year have no conception of the task which has confronted all connected with the movement of transportation. The railroads have been the backbone of our war preparation and without them we would have failed miserably.

If the railroads have been the backbone of our country under war conditions they will also be the backbone of our country during the reconstruction period. Such being the fact, it behooves every man connected with the American railroads seriously to consider just what part he is to perform during this period. We are going to be called upon to do things which at first glance appear almost impossible of accomplishment, not because what we will be asked to do is impractical, but because of the difficulty of getting others to put these things into practice. If we are the men for the job during the reconstruction period we must of necessity get results. This is going to be the measure of our ability as railroad men. Regardless of who operates the railroads during the coming year this fact is clear and unequivocal. It is going to be necessary to produce better transportation facilities, both freight and passenger, at a lower cost than ever before. Wages are at the highest point ever known. All supplies entering into the operation and construction of a railroad are higher than ever before. To offset this increase in the cost of operation, we must of necessity eliminate waste wherever it appears. You, individually, are responsible to the Railroad Administration and to your individual corporations to deliver to the best of your ability a service which will result in decreased operating costs.

There is a wide field for discussion as to how economy can be realized on the locomotive, in the roundhouse or stationary plant, by the transportation man in more efficient methods of train handling, by the mechanical man through better maintenance of locomotives and cars, by the maintenance-of-way man through better track conditions and fewer slow orders, or by the car and air brake man in maintaining the air brake system and so taking care of lubrication on railroads that we can eliminate to a great degree hot boxes, or by the yardmaster in making up trains efficiently.

The results obtained through effecting economies in fuel are far reaching and if by better locomotive maintenance we save fuel, we also assist in speeding up the movement of transportation which in turn effects other economies. We should bear in mind that practically everything done to save coal has a beneficial effect on all other angles of railroad operation. Even now operating officials do not fully realize the tremendous opportunity for a material reduction in the cost of transportation by specializing on the second largest item of expense on a railroad, namely that of fuel.

For years this association has agitated fuel conservation and although some roads have and are eliminating fuel waste

through systematic efforts, we have as yet barely scratched the surface. To get the real reduction in cost that is possible and absolutely necessary for the well-being of the railroads, a more practical interest has to be shown by general operating officials and a more sincere co-operation must exist between the heads of the different departments. This does not mean that there is no interest shown by general officials or that there is no co-operation between the heads of the different departments, but there is still a disposition to continue the campaign of fuel conservation in a haphazard manner and under such conditions the maximum economy can never be attained and waste will go on continuously.

One of the fundamental principles of fuel conservation is co-operation. The manifold duties of operating a railroad are so closely associated and so delicately interwoven that even the slightest error in one department often disturbs the entire organization. A chain is no stronger than its weakest link and a federal manager can have ever so good a fuel organization but if a superintendent fails to co-operate fully there is a break in the chain and the railroad suffers. It is not so much individual effort that is needed as a practical give-and-take co-operation from the chief operating official to the smallest individual on a road.

Hale Holden, regional director of the Central Western Region, was to have delivered an address at the opening session but was unable to attend. W. B. Storey, federal manager of the Atchison, Topeka & Santa Fe, addressed the convention instead. Mr. Storey spoke in part as follows:—

Address of W. B. Storey

We who are handling the railroads are vitally interested in saving fuel. Today we must save fuel in order to get back to normal conditions. On the Atchison, Topeka & Santa Fe the fuel bill for engines alone was one third of the total transportation expenses and one seventh of the total operating expenses during 1918.

There are many difficult phases to the fuel conservation problem. If we could make fuel economy the prime consideration, the matter would be greatly simplified, but service to the public must receive the first attention. Another serious phase is the labor condition. We must handle labor differently from what we did in the past. We must get the men to do what we want by suasion. We must get them interested in these problems, keep them before the men as matters that concern them and the railroads with which they are connected. The man who succeeds is the man who runs the railroads in spite of unfavorable conditions.

Report on Pulverized Fuel

The progress report which the committee has to offer will on account of the unusual conditions which have existed consist of a summary of some results, comments and suggestions. These are offered solely with the idea that they may bring out pertinent frank discussion and constructive criticism on a very interesting engineering subject. All deeply appreciate the earnest work that has been done thus far to progress the art of burning pulverized coal by both manufacturers and those interested in effecting steam economy. There are many things about pulverized coal that we are satisfied with. There are some things that we are

not satisfied with. It is of the utmost importance that accurate analysis of this subject be made in order that progress may proceed along correct lines.

As railroad interest in pulverized coal at this time lies principally in its value as a steam producer, the subject will be considered from that angle only. To date five different American railroads—the Atchison, Topeka & Santa Fe, Chicago & North Western, Delaware & Hudson, Missouri, Kansas & Texas, and New York Central—have successfully operated during test periods individual locomotives equipped for and burning pulverized coal. These tests were all made under regular service conditions, and have demonstrated that locomotives burning pulverized coal will meet the train handling conditions imposed by the different classes of service. None of the locomotives tested is in service at this time, it being necessary in most instances on account of war activity and the demand for power to remove the pulverized fuel equipment and discontinue the experiments.

Requests by your committee for information on results obtained from the tests made on locomotives were complied with. The following points from replies received are of interest:

(a) "A carefully conducted test between two engines of the same class, one burning pulverized coal and the other hand fired, showed that a saving of 23 per cent in fuel burned could be made by burning pulverized coal. The main difficulties encountered were the slagging over of the flue sheet and burning out of the brick arch. The slagging was largely overcome by an air jet to blow off the slag accumulations. A number of burner arrangements were tried, but it was found impossible to overcome the rapid burning out of the brick arch. The cost of replacing the arch brick largely overcame the saving in fuel. The delay to locomotive, replacing arch brick, was also a decided drawback.

"A comparison of total costs of hand firing versus pulverized coal firing on the locomotives tested, which include cost of pulverizing, cost of handling, cost of arch maintenance, interest and depreciation, showed the hand firing to be most economical. In fairness to the pulverized coal it was thought possible to design a firebox that would eliminate such troubles as burning out of the brick arch and show an advantage in favor of the pulverized coal."

(b) "Burning pulverized fuel was very satisfactory, had all the steam that was wanted with splendid control all the time, burning 60 per cent anthracite and 40 per cent bituminous, the bituminous being necessary to increase the volatile. The question of economy is quite another thing and unless a poor or by-product coal can be purchased at a price that will absorb carrying charges, operation, etc., of a pulverizing plant and not exceed the price of a satisfactory lump coal, it should be given careful thought. There is no saving in the quantity of fuel used when pulverized, in fact the difference is in favor of the lump coal. Pulverizing costs between 45 cents and 50 cents per ton.

(c) "The burning of pulverized coal in a locomotive was quite an easy proposition, and with us was very satisfactory. The only difficulties were with the drying, pulverizing and handling of the coal, and also the danger in connection with it. In case of a large number of engines being equipped to burn pulverized coal, were the plant to be blown up, burned or otherwise made inoperative, the locomotives would be tied up until the plant was in service again."

(d) One foreign railroad, the "Central Railway of Brazil," has made marked progress in burning pulverized coal. (See *Railway Age*, Oct. 26, 1917, page 767.)

Something like 200 pulverized fuel installations on stationary plants are in operation throughout the country, comprising central power and lighting stations, street railway

power stations, power stations of various manufacturing industries, railroads, mining companies, smelters, sugar refineries, office buildings, hotels, schools, laundries, etc. These plants are reported as successfully burning all grades and classifications of anthracite, bituminous, sub-bituminous and lignite coals in the pulverized form.

The following is a quotation from the reply to inquiries sent to different parts of the country by your committee asking for results obtained from stationary plants, received from a southwestern railroad. "Our stationary boiler plant

FUEL			
Kind	Wyoming Lignite		
State	Powdered		
ANALYSIS OF COAL			
	As fired	As received	
Moisture	2.83%	19.2%	
Volatile	42.77%	34.3%	
Fixed Carbon	49.90%	42.5%	
Ash	4.50%	4.0%	
B. T. U. per lb.	11,849		
11. Total amount of coal fired		13,821	lbs.
12. Dry coal fired		13,430	lbs.
13. Combustible fired		12,808	lbs.
14. Total coal fired per hour		2,032	lbs.
15. Dry coal fired per hour		1,975	lbs.
16. Combustible fired per hour		1,884	lbs.
QUALITY OF STEAM			
Percentage of moisture in steam		3.3%	
Quality of steam		96.7%	
Degrees of superheat		0.	

WATER	
Total water fed to boiler	99,679 lbs.
Total water actually evaporated	96,390 lbs.
Total water evaporated from and at 212 deg. F.	115,547 lbs.
Water fed to boiler per hour	14,659 lbs.
Water actually evaporated per hour	14,175 lbs.
Equivalent water evaporated per hour from and at 212 deg. F.	16,992 lbs.
Lbs. of water fed to boiler per lb. of coal fired	7.21
Lbs. of water evaporated per lb. of coal fired	6.97
Lbs. of water evaporated per lb. of dry coal	7.18
Lbs. of water evaporated from and at 212 deg. per lb. of coal	8.36
Lbs. of water evaporated from and at 212 deg. per lb. of dry combustible	9.02
Lbs. of water evaporated from and at 212 deg. per lb. of dry coal	8.60
Average heat in coal 11,849 B. t. u. per lb. of coal as fired—	
Heat produced per hour	24,077,168 B.t.u.
Heat required to evaporate a lb. of steam as discharged from the boilers = 0.967 (1195.1 — 32.0) + 0.033 (338.7 — 32)	
= 1124.7 + 10.1 = 1134.8	
Total heat given to the boilers per hour = 14,659 × 1134.8 =	
16,635,000 B.t.u.	
Efficiency of boiler = $\frac{16,635,000}{24,077,168} = 69.1$	
Horsepower developed = $\frac{16,635,000}{33,479} = 497$	
Per cent of horsepower rating developed = $\frac{497}{330} = 151\%$	

that uses pulverized fuel has during the past year been compelled to use a considerable amount of oil, this on account of breakdowns and other troubles, and also the mixing of oil and powdered coal. The manufacturers have for some time, in fact most all winter, been changing, overhauling and remodeling their equipment, and on two boilers we have had very little service on this account.

"I am not going to give you any figures as to the cost of using pulverized coal at our plant here for the reason that our pulverizing and drying plant has not sufficient capacity to properly take care of the demands upon it, and this requires more labor than would otherwise be necessary, hence the cost is greater and would not be a fair comparison. We have, however, kept the plant going on pulverized coal most of the time, but it has been a forced proposition."

From the above summary the following conclusions may be deduced: The development of the art of burning pulverized coal during the past two years has shown marked progress in that the experimental work done and tests made, although still incomplete, have demonstrated the apparent soundness of the principle of burning coal in a finely divided form in suspension, and that the complete commercial success depends upon the further careful working out of such details as correct determinations of proper fineness of the

various grades of coals and economical and efficient methods and apparatus for preparing, storing and transporting the pulverized coal to the stationary plant or locomotive furnace.

It has not been clearly established that coal ground to the extreme fineness and dried to the extent recommended by most of the supporters of pulverized coal best meets the conditions of the practical user operating under widely diversified conditions. The tendency of explosion and spontaneous combustion, which is always present in coal of this character, should be eliminated entirely if possible to do so. The tendency of reabsorption of moisture in containers and transmission piping in stationary plants and at coaling stations of railroads will always be a problem in climates having extreme variations of temperature and humidity. Experiments should be made to determine if thoroughly air dried coal ground to the fineness of say coarse granulated sugar and burned in suspension in specially designed furnaces will not produce greater over all economies.

Further, in so far as the use of this kind of fuel on locomotives is concerned, it seems advisable to give more careful consideration to the individuality of the flexible steam locomotive as it exists today. It is not without the realm of possibility that a pulverizing and stoking device might be arranged that would prepare any grade of coal on the tender and deliver it to the firebox in the pulverized form, thus eliminating all of the expense incident to preparing and transporting pulverized coal from a central plant, which things create a great deal of doubt about the success of pulverized fuel at the present time. The same thing would also apply to a stationary plant in a modified form.

Much ill-advised engineering work and experimenting has been done and some snap conclusions have been rendered without careful analysis of the problem and without doing the very essential laboratory work necessary to establish fundamental facts. Some hurriedly prepared and conducted tests with incomplete and inadequate facilities and equipment have been made, particularly on locomotives on busy railroads during periods of heavy traffic movement. Such tests are more or less void of results, not only from lack of preparation and facilities, but also because employees cannot give them proper attention. For these reasons also adverse opinions and doubt about pulverized fuel prevail in the minds of many.

It does not seem that we are using the laboratories of our great universities to a sufficient extent. Many of these universities have very thoroughly equipped laboratories, and could and gladly would thoroughly thrash out all of the technical questions and lay the foundation for reasonably operative devices before making field applications.

It is particularly noticeable in the reports of pulverized fuel tests received by the committee that practically all dealt with fuel economy only and with a deluge of figures and "heat balances" conclusively proved fuel economy to everybody's satisfaction. Not enough has been said about "cash balances." In this respect conclusive evidence is lacking about pulverized coal, at least in so far as your committee has been able to develop after careful inquiry. This has been disappointing. We hope for some reliable statistics in the near future that will dispel all doubt that now exists on this important matter.

There is little or no question about the ultimate practicality, efficiency and economy of burning coal in a finely divided form, both in stationary plants and locomotives. To develop this fact to a practical conclusion requires thorough co-operation of both manufacturer and user and it is suggested that in view of the immense supply of bituminous, lignite and other grades of coals of various characteristics peculiarly adapted to the pulverized method of burning, that as soon as business conditions again adjust themselves,

the railroads, with the assistance of manufacturers and universities, make the necessary conclusive and exhaustive tests and develop the fixed principles of methods and apparatus necessary to successfully meet the very urgent demands for vastly more economical burning of coal. This is not a question of self-interest of either manufacturer or particular industry. It is one of national interest and urgency.

The report was signed by W. J. Bohan (N. P.), chairman; H. T. Bentley (C. & N. W.), H. B. Brown (L. V.), R. R. Hibben (M., K. & T.), D. R. MacBain (N. Y. C.), J. H. Manning (D. & H.), H. C. Oviatt (N. Y., N. H. & H.), John Purcell (A. T. & S. F.) and L. R. Pyle (U. S. R. A.)

Discussion

J. E. Muhlfeld (Pulverized Fuel Equipment Corporation) submitted a written discussion in which he took issue with some of the statements in the committee's report. He stated that the practicability of burning powdered coal had been established, and asserted that it was necessary to develop it in order to increase the efficiency and the capacity of the locomotive, to decrease the cost of fuel, to permit of using coal of poor quality and to eliminate smoke and soot.

A. G. Kinyon (Fuller Engineering Company) submitted records of numerous pulverized coal installations and reports of tests showing the high efficiency of boilers fired in this manner. Several speakers called attention to the fact that troubles similar to those experienced with pulverized fuel had been encountered in the period of development of practically all the accessories used on locomotives.

M. C. M. Hatch (Pulverized Fuel Equipment Corporation) expressed the opinion that the crux of the matter lay in the design of the locomotive furnace. Large furnace volume is needed for burning pulverized fuel and no locomotive has yet been built with the proper design of furnace for this fuel. Stationary installations, where proper care is taken in designing the furnace, are uniformly successful.

The association decided that an effort be made to secure co-operation from Purdue University, the University of Illinois and the Bureau of Mines with a view to solving the problem of burning pulverized coal.

Teamwork of Enginemen and Firemen

By M. A. Daly

General Fuel Supervisor, Northern Pacific Railroad

Engine crews dispose of nearly all of the coal used on the railroads of the United States. Approximately 95 per cent of all railroad coal passes through their hands. Nearly 130,000,000 tons of coal will this year be mined, hauled and placed on the tenders of locomotives. Into the locomotive fireboxes about \$434,000,000 worth of coal will be shoveled.

Some of the coal mined for the locomotives will not be delivered to the tenders, some of the coal delivered to the tenders will not be thrown into the fireboxes, and some thrown into the fireboxes will not be burned. Coal will be lost from cars en route from mines to coal docks, coal will be lost off the side rails, decks and end sills of the tenders, and unburned coal will be lost through the grates and through the smokestacks. A large percentage of those losses are avoidable. Just how much, however, may always be an unknown quantity. Nevertheless, many railroads are now recognizing that such losses are enormous, and that partial prevention is easily possible.

The value of a ton of coal may be carelessly considered in railroad operation, but the cost of each ton will inevitably take its deliberate bite out of the current operating revenues. Each morning in the United States 65,000 locomotives stand ready for service. At the close of each day \$1,190,000

worth of locomotive coal has been turned to ashes. Every ton of the coal contains a definite amount of potential draw-bar pull. How much of it is actually utilized in pulling cars will depend largely on the condition of the locomotive, the manner in which it is operated, and the skill with which the coal is placed on the firebed.

When a locomotive is properly maintained, properly operated and properly fired, it will not only require the least possible amount of fuel, but it will also deliver the highest possible character of service. All three of these points are of direct concern to road foremen and traveling engineers. In fact, these points embody the chief part of the work of those officers, for most railroad executives now hold that the principal duties of road foremen and traveling engineers are to develop economy in the use of fuel. Economical fuel operation is a mark of good railroading. It may be possible, perhaps, to have economical fuel operation without good railroading, but no more is it considered to be good railroading unless there be economical fuel operation.

The locomotive is not a one-man machine. Its operation requires two men. One is occupied in converting water into steam, while the other is manipulating valves which permit the steam to do the work desired. The two men work at the same time. It may almost be said that the steam is being used at the same time that it is being made. There being a limit to the steam storing capacity of the locomotive, when the engineman stops using steam the fireman stops making it. At least such should be the firemen's aim. The fireman should have advance information of the approximate time of closing the throttle, so that he may control the fire accordingly. The engineer should know that the fireman has this information and that he is guided by it.

Similar information should be common knowledge before starting trains. In this case coal should be placed on the fire a short interval before the locomotive is worked heavily. The successful engineer closely supervises the firing of the locomotive, especially at this time of the trip. The fire must be properly prepared and built up to anticipate the conditions to be met.

This business of fire preparation and fire control, like preventing the waste of coal that works out and drops off end sills of tenders, is the work of the fireman, but it is the engineer's responsibility to see that he does it. When you have an engineer who sympathetically and intelligently supervises the firing of a locomotive, you soon have a fireman who becomes more careful in his work. This, of course, is teamwork. Perfect teamwork is easy to recognize, but difficult to develop. First of all it requires the proper state of mind in the engineer. The engineer must be made to feel his authority and responsibility in directing the work of the fireman. This assumes the full support of his immediate superiors, especially road foremen and master mechanics, and in addition, the full support of their superiors.

It is common knowledge that locomotives make trips on which several tons of coal more are consumed than on other locomotives of the same class, on similar runs, in the same service, over the same piece of track, by other crews. The difference in consumption is in the condition of the locomotive or in the work of the engineer or fireman. Habitually close supervision of the fireman makes it much easier for an engineman to suspect that an engine is getting a little "off" on steaming qualities, when he may proceed to locate the trouble and have it remedied.

There is nothing new about these considerations. Teamwork is universally desired. To realize it is the thing for accomplishment. We all acknowledge the existence of irregularities in practice. These should be removed. This paper was written to ask you to give your opinions and convictions as to how these irregularities may best be removed, after we go back to our respective railroads.

Locomotive Fuel Losses at Terminals

By J. M. Nicholson

Fuel Supervisor, Atchison, Topeka & Santa Fe Railroad

The fuel consumed by locomotives while in terminals is an incident of operation which requires a variable amount of fuel and has been given too little consideration for the quantity involved. The engineer and fireman, who are with the locomotive while from 75 to 90 per cent of the fuel is burned, have been charged with being very wasteful. The remaining 10 to 25 per cent is burned at the terminal in getting the locomotive ready for service and taking it to the enginehouse, much of which is the result of wasteful methods and practices.

Locomotives must be moved from yards to cinder pits, have the fires knocked, and be put in the house in order that necessary repairs can be made. They must be fired up and tests of locomotive auxiliary appliances properly made, after which they must be moved from the roundhouse to the train. These essential activities of operation require the use of fuel, but the fuel used in addition to that required for these purposes must be considered as waste.

When a locomotive is brought to a terminal the fire should be burned down to such a point that it will not be necessary to rebuild the fire in order to get the water level in the boiler to the proper height before knocking the fire. The dampers on oil burning locomotives and also coal burning locomotives, so equipped, should be closed as soon as the work at the cinder pit is completed and the blower shut off to reduce circulation of air through the boiler.

The roundhouse capacity should be such that no delay will be caused in getting the locomotive into the house. When a locomotive reaches the house a competent inspector should enter the firebox and see that the flues are clean and free from leaks. The arches must be clean and in repair. The grates must be thoroughly cleaned, and grates having broken fingers or excessive openings repaired or removed. The ash pans must be thoroughly cleaned and special attention given to see that the air opening under the mud ring is cleaned. The front end should be inspected to see that it is self-cleaning and free from air leaks.

As soon as the boiler and grate work is completed the grates should be bedded down with from three to four inches of coal evenly distributed over the entire grate area. The coal which falls through while bedding down the grates should be reclaimed. Tests show the coal reclaimed will vary from 80 to 200 lb. per locomotive, depending on the size of coal used and the amount of surface moisture on the coal. The coal can be reclaimed by collecting it in a bag fastened to the ash pan slide and removing the bag as soon as the grates are bedded down, or at larger terminals a pit on the outgoing track can be used for dumping this coal and conveying it into the car. A terminal handling fifty locomotives per day will conserve from fifty to one hundred tons per month by reclaiming this coal.

In case the boiler is to be washed, the heat in the boiler is entirely wasted unless the roundhouse is equipped with a hot water boiler washout system. A plant of sufficient capacity, if properly maintained and operated, will reduce the time consumed in the operations of washing boiler from 25 to 50 per cent and reduce the amount of fuel used in firing up from 25 to 30 per cent. The saving of from two to three hours' time in getting the locomotive back in service is an important factor under present operating conditions, as is also the saving of from 600 to 700 lb. of coal per locomotive.

In many cases where boilers are not due to be washed out engines are allowed to stand in the roundhouse twelve to fifteen hours before the time set for the locomotive to leave the roundhouse. During this time the heat in the boiler has been passed out through the stack unless a stack cover

is used or the dampers closed to prevent circulation of air through the boiler. This heat waste can be found in practically every roundhouse, and results in several tons of coal per locomotive being wasted each month. The time required to furnish a locomotive is greatly influenced by the pressure maintained in the roundhouse blower steam line. Insufficient pressure results in the use of more coal in firing up a locomotive and decreases operating efficiency. The use of old ties, old car material, shavings, etc., will reduce the amount of coal consumed and should be used where practicable.

The chief dispatcher should furnish the roundhouse foreman with a list of trains that he expects to run and the roundhouse foreman should furnish the dispatcher with a list of locomotives he expects to have ready. The exchange of these lists three times in twenty-four hours is advisable, after which the locomotives should be ordered for a scheduled leaving time, giving the roundhouse the necessary time to fire up the locomotive and call the engine crew. This will avoid holding locomotives under steam in cases where trains are set back or cannot be run according to the lineup. In cases where locomotives are fired up as soon as the work is completed and allowed to stand under steam for seven hours, the fuel wasted is equal to the amount of fuel that is necessary to furnish the locomotive for service. This is not an uncommon occurrence where despatching schedules are not in effect and given close supervision.

The wages paid for one hour's terminal delay on a freight train is a loss equivalent to the cost of one ton of coal, also eight locomotive hours under steam in addition to the time actually necessary to get the locomotive ready for service is a loss equal to the value of a ton of coal. Every locomotive on a division is burning some fuel at the terminals that is unnecessary, and many locomotives are burning before each trip fuel of greater value than the loss of wages paid for one hour's terminal delay. If this loss were given as close supervision as is given the wages paid for terminal delay, the cost of transportation would be reduced. Superintendents should know personally that locomotives are not being held under steam unnecessarily on their division and that co-operation in despatching locomotives does exist.

The fuel that is consumed as a result of lack of facilities for handling is a costly proposition, and adequate roundhouse and shop facilities should be provided. Repairs to turntables, roundhouses, coal chutes and tracks at the terminal should be made before cold weather sets in, as it may result in congested single track movement at coal chutes and cinder pits or tie up the entire roundhouse, all of which waste fuel. Proper care of a fire in the roundhouse contributes to economic locomotive performance on the road and also reduces the amount of fuel used at the terminal. The locomotive appliances should be tested out before leaving the roundhouse for the train to see that they are in the best possible condition to do their work, which means a saving of fuel on the road that, in most cases, cannot be accomplished after leaving the terminal. The train line leakage should be determined and the leaks repaired at the terminal. Train line air leaks cost a railroad company much more than it costs to repair them.

Locomotives should be maintained to prevent serious steam, air and water leaks. Throttles leaking, pops leaking and air pumps running in the house are to be avoided. All of the operations at a roundhouse contribute to fuel economy, and men should be impressed that neglect on their part often results in a waste of fuel greater than their day's wages before the locomotive reaches the next terminal where proper repairs can be made.

The amount of coal required for the period of firing up a locomotive and getting it ready for service under careful handling should be determined. The actual consumption

against the required consumption is the fuel efficiency of the dispatchers and the roundhouse organization. This efficiency is not a maximum, even on the best managed and best equipped roads. The magnitude of the amount of fuel involved in these losses should provide a strong incentive to renewed effort in fuel conservation as these conditions of fuel waste are decreasing operating efficiency and increasing the cost of transportation.

Discussion

Considerable discussion was brought out relative to the maintaining, banking and knocking or dumping the fires in locomotives brought into terminals, and also the use of covers or dampers on locomotives for fuel saving purposes. F. P. Roesch, fuel supervisor of the Northwestern region, stated that tests which were made on roads in the Northwestern region showed a saving in fuel by maintaining the fire in the locomotives brought into terminals when they remained for a period of eight hours. For locomotives remaining in for a period of 16 hours, a saving was accomplished by banking the fires. For those locomotives remaining in for a period of 24 hours or more, the fires should be dumped or knocked. He said further that good results had been obtained on some roads by using stack covers, but these should be provided with holes to permit some circulation.

S. Bisbee, fuel supervisor on the Boston & Albany, stated that his experience showed that the locomotives had to be turned over so rapidly for further use that they were not able to dump the fire and that he did not believe in dumping fires unless the locomotive remained in for a period greater than 30 or 36 hours. He also rather questioned the advisability of stopping the stack with a cover or damper with a fire in the locomotive. He further stated that firemen should estimate the amount of fire required in the locomotive for the maximum amount of work the locomotive may be expected to do when brought into a terminal. Another speaker stated that it was the practice of one road to prepare a weekly statement to show an estimate of how much coal would have been burned had the fires not been dumped or banked. Recent estimates showed that approximately 2,000,000 lb. per week would have been burned.

J. J. McNeill, supervisor locomotive operation on the Erie, stated that fires should be banked when locomotives are in the terminal less than 20 hours and dumped when they are to remain in for a longer period and also that considerable saving in fuel could be had by proper banking. He further stated that in making tests the results should be reported not only to the officers but also to the men who help to make the tests. In this way a system of co-operation of considerable benefit is brought about.

What Can a General Operating Officer Do to Promote Fuel Economy?

By F. H. Hammill

General Superintendent, Northern District, Union Pacific Railroad

This country in the last century has made wonderful progress along all lines, and no phase of this development has been of greater magnitude or of more importance than that of transportation. When we stop to think that within practically a lifetime there have grown up lines of transportation extending over 260,000 miles, spreading through nearly every county in every state in the Union; when we stop to analyze the tonnage that must be handled over these lines, and that the figures indicate that the increase in tonnage handled in one month of the year 1917, over that of the corresponding month of the previous year, was greater than the total gross tonnage handled by the railroads of England, France, Germany and Switzerland, it brings out somewhat the

magnitude of the transportation problem in this country.

At our last annual meeting one of the prominent mechanical men of the country, while addressing this society, stated that we "were to be congratulated for the privilege of living in this age and at this particular time. There never was a time when history was being made so rapidly, when men were doing so much, nor when so much was required of them." When we stop to fully analyze this statement, how truly it applies to the transportation problem! The founders of our government, when encouraging the enterprise of linking the ends of this country together, little appreciated the great value, especially in times such as we have just passed through, of adequate transportation facilities, manned by well trained, experienced officers and men. Until this critical time arrived, the coal producer hardly appreciated the value toward increased production and the financial success of his property, of a well equipped and well managed transportation department. This same thing was true of the manufacturer, the wholesaler, the retailer and the producer of every known commodity.

The past few months have been very profitable in bringing home to those requiring transportation its value in the development of their business. Likewise, the same recent months' experience should, and I feel has, brought closely to the mind of those directly in charge of transportation their responsibility for transportation, and their duty toward the public in giving the benefit of their years of experience toward developing the maximum transportation facilities.

It is an unquestionable fact that during the past few years men in charge of transportation properties in this country have been confronted with many difficulties and sometimes most discouraging problems. They knew from their years of experience and their ability to anticipate just what would be required in the way of added facilities, effort and financial requirements. On the other hand, they were confronted by difficult problems, which prevented them from conducting their plans as their experience and knowledge best dictated. We, therefore, confidently feel that the past few months have been of great benefit, not only in the development of a realization of the importance of reliable transportation facilities but also in bringing out what each individual connected with transportation owed to the public and to his country in developing the best, most reliable and yet cheapest transportation facilities that could be produced, in order that business might expand and our country continue to prosper.

The future, as we see it, is going to present even greater problems to the management of our railroads. Expenses in the way of labor charges are pretty well fixed and will permit of little reduction for economy. Prices of material will continue on a much higher level than in previous years. On the other hand, the public has learned the value of and the need for the best of transportation, and is going to be insistent on its requirements being met. The problem must resolve itself, therefore, into the development of every avenue of legitimate economy through more detailed study of every item of expense of railroad operation.

Records clearly show that next in importance to labor expense is that of fuel. When we recall that in the year 1917 there was produced in the United States approximately 621,000,000 tons of bituminous and anthracite coal, of which about 175,000,000 tons, or 28 per cent, was consumed by railroads, this statement cannot but bring home very forcibly the duty of the general transportation officer in promoting fuel economy.

A properly organized fuel department, having the lively interest and co-operation of the operating department, can, through careful study of all the details, be productive of very noticeable financial returns. It is our judgment that the question of fuel conservation presents one of the most important and necessary avenues for needed economy. It should and properly does bring forcibly to the minds of

general operating officers what they can and must do to study this problem in order that we may avail ourselves of this needed economy.

Discussion

The discussion of this paper dealt largely with the question of establishing co-operation between the various departments and the men in the ranks by means of educational and co-operative meetings. A. D'Heur, manager fuel oil department, Southern Pacific, stated that staff meetings are being held on that road every 30 or 60 days which are attended by the enginemen who have the best fuel records according to the performance sheets. He stated that the tendency has been to create better co-operation and a greater interest among the men in their work. He presented the following figures to show fuel savings during the past few months on one division: January, \$9,321.00; February, \$12,950.00; March, \$17,485.00.

Certain Essentials

By Eugene McAuliffe

Manager, Division of Operation, Fuel Conservation Section
United States Railroad Administration

I wish today to say a few words on certain compelling features, which if attended to will accomplish more in one year towards effecting fuel and operating economies than has been accomplished in the past five years. Briefly, the outstanding essentials of the railway fuel problem, as I see such, are:

Clean Coal. Buy clean coal, get clean coal. There is not a coal contract in existence that does not suppose the delivery of the cleanest coal that the particular mine from which the purchase is made is capable of producing. Do not ask from the coal producer the impossible, but insist on the possible. Tests have proved that with coal containing 12.5 per cent of ash taken as 100 per cent, the relative efficiency falls as the ash increases until coal with 40 per cent of ash marks a total lack of efficiency. At the mine face or on the mine tippie, is the place to clean coal. The excess and removable non-combustible matter can be separated cheaper there than in the locomotive fire box. Let the producer do the cleaning, such is a proper part of the cost of production. I have found on a majority of roads an insufficient and frequently untrained inspection force. The roads which most need an inspection force are most lacking in this respect. Ninety-nine per cent of the coal operators, all that are worth considering, will appreciate the help that an intelligent inspection force can give them. Good inspection supposes many things, including contract, quality, weights, clean equipment and proper class of equipment.

Distorted Valve Motion. The next cheapest thing we can do is to organize the work of establishing and maintaining a proper distribution of the steam made from the coal purchased. I commend to your attention the paper, written by J. W. Hardy, on fuel losses due to defective valve motion, then read the circular just issued and immediately proceed to carry out the simple recommendations therein contained.

Air Leaks in Locomotive Front Ends. On August 1, 1918, the Fuel Conservation Section issued Circular No. 8 calling the attention of motive power men to the fuel losses that result from air leaks in locomotive front ends, particularly, those that surround the steam pipes where they leave the front end. The recommendations contained in this circular were followed in some instances; in others, ignored. A locomotive suffering from front end leaks invariably fails unless her guardians have compromised with her cost of keep and earning power by choking the nozzle.

Distorted Draft Apparatus. A limited survey of the interior of locomotive front ends can be easily made by looking down into the stack when the engine is cool, using a common flash light. This casual inspection, if made, will astonish many of you. Here again we lack organization and method. Distorted draft apparatus invariably indicates shiftlessness.

Stopped Up Flues, Grates and Ash Pans. Another essential has been covered briefly by the recent Fuel Conservation Section circular dealing with stopped up flues and choked superheater unit tubes, choked air openings in grates, and restricted air inlets in ash pans. An insufficient air opening in the ash pan represents a defect in design; the rest represents defects in execution. These conditions again result in the application of the well known remedy, choking the exhaust nozzle, with the result that the engine struggles part, or all the way over the division, at the expense of the fuel bill, delaying the reduced tonnage handled, with corresponding delays to opposing trains which are sidetracked at meeting points to wait for the crippled engine.

The Superheater. Another essential I wish to speak of relates to the proper maintenance and handling of what is the most substantial fuel saver ever put on the American locomotive, i. e., the superheater. The purpose of the superheater is to conserve fuel and water, and to increase the general efficiency of the locomotive. In some instances, this result is obtained to the extent of 100 per cent, the measure of efficiency shading off in other cases until the apparatus is frequently not able to absorb the load of improper locomotive maintenance put on its shoulders. Certain engineers carry water levels so high as to transform the superheater into an evaporator, getting the train over the road at the expense of much fuel and a few additional tanks of water. We have found superheater units not only improperly installed, but poorly maintained, and often they are not tested with sufficient frequency to locate the steam leaks that occur in the front end when the engine is working. The Fuel Conservation Section recently issued a circular on superheater losses; they deserve your best attention.

Back Pressure Losses. A condenser cannot be used on a locomotive and the limitations that surround the locomotive necessitate a restricted exhaust in order that a sufficient rate of combustion can be maintained with a relatively small boiler, generating many hundreds of horse power. Under the conditions that commonly obtain, of all the fuel that is used in the locomotive, only about six per cent is available for use in moving freight or passengers. Excess back pressure losses, therefore, apply against the 6 per cent saved for tractive purposes. Under the circumstances, why cripple the locomotive by choking the exhaust to offset lack of proper adjustment of draft apparatus, the closing of air leaks in front ends, the cleaning of tubes, super-heater flues, etc.?

The Old Type of Locomotive. Many of us began with the Eight wheel type of locomotive with low steam pressure and small firebox and grate area. These little engines had no fuel saving devices but they played their part in the greatest peaceful drama the world ever saw, the building of the Western Empire. Too many light locomotives have been scrapped in the past, instead they should have been modernized and kept in service suited to their capacity. In many instances locomotives too heavy for the job are employed to the detriment of train mile costs and the permanent way. The fuel saving attachments developed in recent years, with the exception of the compound air pump, only earn when the locomotive is moving, and it is very probable that improvements of the above character, if applied to the existing light locomotives now lacking them, would pay an equal or greater return than is being received from their application to the more modern locomotives. We frequently overlook the fact that the heavier types of loco-

motives, of which these devices are considered an essential part, makes a lower average mileage than the lighter, and consequently more mobile type of locomotive.

In conclusion, I wish to suggest the absolute importance of bringing every locomotive now in service, or that will be required for the service, up to the maximum standard of efficiency. I have been told that the work of applying superheaters and brick arches under order, and in some cases, in stock, has been held up on certain roads because of insufficient funds to apply them. This is unfortunate, and I trust the condition will be quickly remedied.

Dirt in Coal

By L. J. Joffray

General Fuel Inspector, Illinois Central Railroad

The ash content in coal varies widely in different localities and frequently there is considerable variation in the same locality under different conditions of mining and preparation. The normal amount of ash may be considered as that found in the face sample of the seam proper; the excess ash is that which is added to the coal from the roof or bottom in the process of mining and which is not eliminated before the coal leaves the mine.

Lump coal made over an inch and a quarter (1¼ inch) screen usually shows the normal per cent of ash, while the inch and a quarter (1¼ inch) screenings in most cases shows one and one-half times the percentage of ash contained in the lump.

The ash content in screenings can be reduced nearly to that of the screened lump by the use of a jig gravity washer, with an ample water supply and a convenient place to deposit the refuse. However, the washing of screenings has been considered too expensive while the price of all coal was low, but since prices have gone 60 per cent and more higher, and will probably remain so, it may be well, and at the same time profitable, to eliminate the excess ash by washing in the vicinity of the mines, thereby saving the use of cars for and the long haul on inert material to points where coal is finally consumed, the cost of which would be about six mills per ton mile.

The following table showing ash and B. t. u. content of coal from a bituminous mine in the central west district illustrates how the ash content of screenings can be reduced by washing:

Coal from one mine in Central West—		Ash	B.t.u.
Dry or unwashed screenings.....	22.61%	8.895	
Washed screenings	14.05%	10.085	
Lump	12.39%	10.499	

The excess ash in mine run and prepared sizes, made over an inch and a quarter screen can easily be removed by hand by the miner at the working face when loading into mine cars, or by having men or boys working on picking tables or belts while the coal is passing to the railroad car.

The performance of this work can be looked after by a regularly assigned fuel inspector. We are using a system of close inspection with suggestions to the mine superintendents on the ground while the coal is being loaded. As a result of this effort, the impurities removable by hand picking and based on actual carload tests have been reduced from an average of 2.733 per cent in the year 1911 to an average of 1.535 per cent in the year 1917, or a net reduction of 1.198 per cent which applied to a consumption of 4,000,000 tons of coal used annually represents 47,920 tons less ash, requiring the use of 958 fifty-ton cars to move it. The transportation cost of moving this excess ash an average distance of 266 miles, based on an "out of pocket" cost of five mills per net ton mile, equals \$63,733.60 per annum. This, however, is but the lesser saving.

Taking the established estimate of increase in efficiency of $1\frac{1}{2}$ per cent for each reduction of 1 per cent in ash, the saving from this source, i.e., increased evaporative efficiency, with coal at a delivered price of \$3.68 per ton equals \$264,518.40, or a total saving of \$328,252 per annum. What the measure of the economies following from reduced engine failures and reduction in enginehouse expense amount to are difficult of computation.

Elements of Ash

The effective combustion of coal depends largely on the nature and per cent of impurities it contains, especially so if the ash has a tendency to clinker, which is dependent on the percentage of silica, iron and lime in its composition. Tables I and II give analyses of coal and ash used in ten burning tests from ten different mines in Illinois and Indiana.

TABLE No. I
ANALYSES OF COALS

Test number	Moisture, per cent	Volatile matter, per cent	Fixed carbon, per cent	Ash, per cent	Sulphur, per cent	B. t. u.	Clinker?
1	3.37	31.31	55.19	9.63	.64	12,325	No
2	6.02	30.00	53.50	10.30	1.30	12,136	No
3	4.61	31.35	54.05	10.00	1.19	12,368	No
4	2.92	33.10	51.25	12.73	2.96	12,389	Yes
5	4.99	39.22	43.99	11.80	4.43	11,768	Slightly
6	3.41	37.12	45.62	13.85	4.02	11,842	Yes
7	5.13	37.70	44.31	12.80	4.52	11,693	Yes
8	2.86	36.04	43.14	17.96	4.58	11,124	Yes
9	8.49	34.87	48.16	8.48	1.47	12,251	No
10	4.68	38.59	44.24	12.49	4.50	11,921	Yes

TABLE No. II
ANALYSES OF ASH

Test number	Sulphur (S) per cent	Silica Oxide (SiO ₂) per cent	Iron Oxide (Fe ₂ O ₃) per cent	Aluminum Oxide (Al ₂ O ₃) per cent	Calcium Oxide (Lime) (CaO) per cent	Magnesium Oxide (MgO) per cent	Color of ash
1	.64	59.0	3.1	31.0	5.6	1.3	White
2	1.30	55.2	8.3	26.6	7.3	1.3	White
3	1.19	56.1	8.1	27.2	5.4	.9	Light gray
4	2.96	45.4	25.3	16.9	11.6	.8	Reddish gray
5	4.43	49.1	32.2	13.5	4.5	1.4	Reddish gray
6	4.02	35.1	22.4	10.2	30.8	1.5	Reddish gray
7	4.52	43.3	24.1	9.0	19.9	1.2	Reddish gray
8	4.58	44.8	20.3	18.6	16.4	1.5	Reddish gray
9	1.47	45.8	20.2	28.3	5.4	0.0	White
10	4.50	27.1	52.3	14.1	4.4	1.2	Dark gray
Fusing tem. deg. F.	239	3227	2840	3416	3452	3882	.....

Table I gives the usual proximate analyses of the coals. Table II gives analyses of the ash. By referring to the column showing the clinkering and non-clinkering coals and then making a review of the ash table, we observe that the coals with non-clinkering ash are low in both sulphur and lime. In burning they did not clinker in a dazzling white fire of an approximate temperature of 2,900 degrees F., while the ash in the clinkering coals fused at a firebox temperature of approximately 2,200 degrees F., which indicates clearly that when the sulphur and lime content exist in high proportion to the silica, iron and aluminum oxides, it is the direct cause of the ash fusing at the lower temperature.

The bottom line of Table II shows the fusing point of the sulphur and the different oxides. From this it will be seen that by taking each element separately the fusing point is at a higher temperature than is usually obtained in the furnace of a boiler. However, by combining these elements in proper proportion with the sulphur, fusion at a much lower temperature will take place.

The conditions of these ten experiments as to draught, etc., was identical in each case. However, I have since observed that either one of the coals containing the clinkering ash will give better results both as to combustion and reduction of slag in the ash by increasing the draught, which increases the flow of air through the fire bed and has a tendency to keep the temperature of the fire below the fusing point of the ash. Hence it is always good policy to assign the clinkering coals to a lower class of service, as switch engine, local freight, and other light runs.

Address of Frank McManamy

Under the law the position of the Railroad Administration is in many ways analogous to that of a tenant, the landlord being represented by the corporate interests. The landlord whose rental is fixed (in this case by Act of Congress) naturally hesitates to make extensive and expensive improvements which do not have the effect of increasing his revenue regardless of the saving they may effect for the tenant; for that reason more than for any other it is necessary for us to do our very best to make our savings with the equipment, with the facilities and with the organization we now have.

It is comparatively easy to make a substantial saving in the cost of locomotive fuel by wholesale application of recognized fuel saving devices as for example, the brick arch and the superheater, and the Railroad Administration is in favor of such improvements and has worked out a very definite program along that line. Unfortunately, however, the application of these devices involves charges to capital which must be borne by the railroad corporations and probably for the reasons stated, the acceptance of these charges by the corporation is not always easily obtained; therefore, the progress being made in this direction is not entirely satisfactory. But even if we are denied the privilege of installing those improvements which we know will effect fuel economy there is no reason why we should not maintain in as thoroughly good condition as we know how these devices with which locomotives are equipped, nor is there any reason why we should not make every effort to save fuel by eliminating all waste of steam and water.

Broadly speaking conservation of fuel from the Railroad Administration standpoint requires careful supervision by the Fuel Conservation Section and close co-operation on the part of practically every department in the Railroad Administration, and in this the International Railway Fuel Association can be especially helpful. Fuel economy like practically all other economies is not as a rule accomplished by saving one huge sum, but the huge sum which it is possible to save is made up of the accumulated results of many small and what may sometimes appear as insignificant items. We gain nothing from conventions unless we make use of the knowledge obtained. It is comparatively easy to attend a convention of this kind, participate in the discussion and bring out some of the most valuable points in connection with conservation of fuel during a three or four days' session, but it requires real courage and perseverance as well as enthusiasm to go back home and for the remaining 360 days of the year consistently and persistently practice what we preach here.

Conservation of fuel is one of the important matters before the Railroad Administration during the period of government control and will be no less important when that period has passed. It is the desire of the administration to have the sympathetic co-operation of the International Railway Fuel Association and all of its members as individuals in effecting what will make for the conservation of fuel. It is the desire of the administration to co-operate with the members of the International Railway Fuel Association in everything that relates to the purchase, inspection, weighing, distribution, handling and accounting for fuel, as well as in its economical use to bring about the greatest possible saving.

The Railroad Administration will aid in every possible way by urging the proper maintenance of locomotives, the application of fuel saving devices and otherwise modernizing them and will be helpful in every other way that a central organization can be helpful under the present method of operation, but if we are to be successful we must have team work in getting the very best we can out of what we have got.

[The report of the proceedings of the convention will be continued in next week's issue.]

New York Railroad Club Has Foreign Night

Papers Presented by Heads of Russian and Japanese Railway Commissions and on the Lines in Bolivia

THE NEW YORK RAILROAD CLUB at its monthly meeting on May 16, introduced a new idea in railroad club activities by having a program of speakers on railway conditions in other lands. Papers were presented on railway conditions in Russia by A. I. Lipetz, chief of the Russian Ministry of Ways and Communications in this country; on the railways of Bolivia by Philip W. Henry, vice-president of the American International Corporation, who was at one time president of a company which constructed many miles of railway in that country; on Japan by K. Yamaguchi, an officer of the Japanese Imperial Government Railways and at present the resident representative of that system in New York, and by Fred Lavis, consulting engineer of the American International Corporation who presented stereopticon views illustrating railways in Spain, Mexico, Argentina, and Colombia, in all of which countries Mr. Lavis has been engaged in railway construction work. A large attendance at the meeting evidenced the interest which railway and railway supply men are showing in export trade.

Abstracts of the papers follow:

The General Railway Situation in Russia

By A. I. Lipetz

Chief, Russian Ministry of Ways and Communications in the United States

The Russian Railway system, before the war, comprised 43,810 miles of line, or only a little more than one-sixth of the mileage of the railways in the United States. It is noteworthy, however, that it had the second largest mileage of any country in the world. Of the 43,810 miles in Russia, 36,540 was in European Russia and 7,270 miles in Asiatic Russia. The latter mileage included four principle roads—the Trans-Siberian, the Amur Railroad, the Tashkent and the Middle Asiatic Railroad. In addition, there were a few roads of lesser importance, such as the Orsk, Troitzk, Altai, Kooloondine, Kolchooghin, Atchinsk-Minoosinsk and Southern Siberian. These roads are each from 120 to 450 miles in length and some of them are under construction. In using the expression "of lesser importance," I mean to say that they are not trunk lines as are the first four mentioned. Still they are of great value as feeding lines and for connecting the trunk lines with rich territories in Siberia.

The greater part of the mileage—36,540 miles, as above noted—is in European Russia, excluding Finland, but including Russia proper, part of Poland (so-called Russian Poland), Lithuania, Ukraina, Crimea and Caucasus. About two-thirds of the entire Russian system belong to the government and one-third to private companies, but even the privately managed roads have been under government control, in so far as the technical operation and the tariff regulations are concerned, and, to a certain extent in regard to administration and financial operations.

During the six years just preceding the war (1908-1914), the Russian railroads were very much improved. From a system which was a burden to the government treasury, it was turned into a system making a considerable profit. Many new lines, governmental and private, were constructed during that time and very considerable improvements were made in the rolling stock, in the methods of operation, and in the

regulation of traffic. Since 1912, all new railroads have been constructed in accordance with a plan which had been very carefully worked out in advance and which took into consideration the proper development of the country and of its rich territories and also such problems as the colonization of uninhabited regions in Russia. In 1916, during the war and a few months before the revolution, a new plan was adopted, including provision for railroads which were to be built in the five-year period (1917-1922), and in a succeeding five-year period from 1922-1927, and also railroads for strategical purposes. An appropriation of three billion roubles (one and a half billion dollars) was made by the Duma for the railroad construction during the first five-year period.

Equipment

The Russian railroads had 22,700 locomotives which were of good design and workmanship, as heavy as the bridges and the roadbed would permit, and equipped with the more modern improvements which have been generally adopted. For instance, in 1910, 570 locomotives or 2.5 per cent of the total number of locomotives were equipped with superheaters, while in the United States only 360 locomotives or 0.6 per cent were thus equipped. In 1893, we started to build standard types of locomotives and in 1914 there were 7,376 locomotives or 32.5 per cent of the total number, which were of practically one type, the so-called "normal" slow freight engine. Of standard fast freight engines, there were 1,300 or 5.7 per cent of all the locomotives in service. Then there were 600 slow heavy freight locomotives. In 1915, we designed and had built in this country 1,075 Decapods, the standard fast heavy freight engine.

Practically all freight cars were of a standard type—the so-called "normal" freight car—which has proved quite satisfactory for local conditions on Russian Railroads, for over three decades. The dead weight of this car is only 42 per cent of its capacity. This, I believe, is the lowest ratio of any freight car ever built in such great numbers.

All of these cars are pooled over the entire system. Every railroad possesses a certain number of cars but this does not mean that specific cars are in its actual control, but rather that that number of cars is assigned to it. The idea is that each railroad is entitled to the use of 100 per cent of the cars owned by it; if, therefore, one railroad delivers a certain number of cars to another road, the receiving road is obligated to deliver to the first road at the same point and on the same date, from midnight to midnight, an equal number of cars. If it delivers less, a penalty of \$1.50 for each 24 hours is charged against the delivering road by the receiving road and the difference must be offset by the delivery of extra cars on the following day. If the road fails to do so, day after day, the question is referred to the operation department of the Central Railroad Administration and relief is extended by commandeering cars from another railroad or by increasing the number of cars owned by the railroad which is short and supplying the new cars from the builders. The periodical inspection and repairs take place wherever the cars happen to be at the particular time and the cost is charged to the railroad which owns the cars at a certain schedule of rates. This system, which has been in general use in Russia for more than 30 years, is aimed to reduce the waste of car transportation and reloading and to simplify car accounting. A member of the American Railway Commis-

sion to Russia states that "having served on the Committee of Regulation between Railroads for 10 years, I have no hesitancy in saying that the Russian pooling arrangement is far advanced over the American method of handling freight cars."

Results of the War

War conditions have changed the Russian railroads very considerably. The traffic has changed entirely. Before the war, grain was carried from central European Russia and the Southeastern granary to the Baltic and Black Sea ports; coal moved from the Baltic ports and Southern Russia to Central Russia; manufactured goods from Western, Northern and Southern Russia to Central Russia, Siberia and Middle Asiatic Russia; Siberia had very little traffic as compared with European Russia. With the beginning of the war, the traffic to and from the Baltic and Black Sea ports ceased to exist; coal had to be carried from southern Russia all over the country; huge quantities of ammunitions and foodstuffs had to be moved from all portions of the country to the extreme West—the battle lines; and Trans-Siberian railroads from Vladivostok and railroads running from the northern ports—Archangel and Murmansk (constructed during the latter part of the war) became very active because of the immense new import business. The number of locomotive miles and car miles increased by 22 per cent as compared with the pre-war times. The number of locomotives had increased only 1.5 per cent and the number of cars 3 per cent more than before the war, but the number of cars and locomotives in good order in 1916 was from 3 to 8 per cent less because of the shortage of material and skilled help in the works and shops—conditions which were also experienced in this country during the war. As we all know, a continued orderly traffic is possible when the requirements of movements of goods, the necessary rolling stock for the required movement, the facilities for the manufacturing of material and spare parts for the upkeep of the railroads, and the movements of goods for industry balance each other. Within reasonable limits, there may be fluctuations when one or the other of the above-mentioned factors can be overstrained for a certain period of time; when this strain is extended beyond a reasonable limit, transportation is subjected to a disturbance and later to a disorganization. This happened just before the revolution in March, 1917, and during the revolution, and whatever was saved was later destroyed by the general disorganization and demoralization of the whole economic life of Russia under the Bolshevik regime.

Present Conditions in Bolshevik Russia

For further consideration of the Russian railroad situation, it is advisable to consider the country as divided into two parts—one under the Bolshevik control and the other, including Siberia and parts of Russia, under the control of the anti-Bolsheviks. We have no recent information about the railroad situation in European Russia but such information as we had received indicates that the situation is indeed desperate. The railroads are disorganized to the limit, the trains run only occasionally when a roundhouse can supply a locomotive and there is sufficient coal. On some roads trains are not moving at all, and on others all ordinary train movement is suspended in order to give precedence to trains with food supplies for the cities. The total number of locomotives now in operation is below 4,000, out of a total of 21,000 in European Russia; in other words, 82 per cent of the locomotives are in bad order. Locomotives cannot be overhauled because of the lack of material and spare parts. They cannot be replaced by new locomotives as the locomotive works are practically at a stand-still.

Passenger cars are so badly worn out that very few of them are suitable for carrying passengers; indeed, such pas-

senger traffic as is handled is largely in freight cars, or in so-called "teploshkas." The latter is practically a standard freight car equipped with a stove and having double walls to retain the heat. These cars are always overcrowded and traveling in Russia for long distances is accompanied by great inconvenience and distress. The last information that reached us was to the effect that the Bolshevik regime managed to introduce some order on the Nicholas Railroad between Petrograd and Moscow and on a few other roads and that there is now on some roads a regular service of one or two good passenger trains daily; this, however, is an exception which proves the general rule. There are no financial or similar problems on the railroads. The wages are as high as the workmen's committees are pleased to make them and the expenses, no matter how large they are, are covered by paper money from the state banks. The result of this is that Russia, which exported yearly about 8,000,000 tons of grain or 12 per cent of its total production, now faces general starvation in large cities because of the disorganization of the transportation system.

Better Conditions in Siberia

The situation in Siberia is very different. The railroads in that section have been considerably disorganized by the Bolshevik but about a year ago the loyal Russian forces drove out the Bolshevik from the territory served by the Trans-Siberian railroad and the reorganization of the transportation system started at once. Fortunately, the Russian Deputy Minister of Ways of Communication, L. A. Oustrugov, happened to be in Siberia at that time and a new Ministry of Ways and Communications was organized at Omsk. As soon as communication was established through Siberia the Russian Mission of Ways and Communication in America started to ship material from Seattle and New York to Vladivostok. This included rails, locomotives, cars, various kinds of machinery, and large quantities of spare parts for locomotives and cars. From November, 1918, to the present time, we have sent to Russia nine complete ship loads and partial shipments on other ships. All together we have shipped 43,600 tons and we have about 20,000 tons waiting for future shipments.

The news we receive from Siberia indicates a general improvement in the situation. New railroads have been built or are under construction as, for instance, the Semipalatinsk-Sergiopol and the Petropavlovsk-Kokchetava or the South Siberian Railroad from Orsk to Semipalatinsk, the construction of which was stopped during the revolution but has now been resumed. A new department at least for Russia, is a colonization department, which is developing plans for the colonization of Siberia. Trains are running on regular schedules; the once famous weekly Siberian express, made up of eight passenger cars and dining car, is running again from Chelabinsk (Ural Mountains) to Vladivostok, covering a distance of about 4,800 miles in nine days. Service is not as good as it was before the revolution, but it is better than it was in 1918. The Omsk Ministry of Ways of Communication is now considering the addition of another weekly express train from Omsk to Vladivostok. The other passenger trains and freight movement are now fairly regular—about 4 or 5 trains daily in each direction according to the latest advice in March, 1919. In other words, about 150 cars leave daily from Vladivostok for the interior of Siberia. This is even more than the traffic before the war and 50 per cent of the traffic during 1915-16. It is true that this schedule is not ample for the traffic demands as, of the 150 cars, only 10 can carry private shipments; the remainder of the cars are loaded with goods for the account of the war department, railways, zemstvos, cities and municipalities; these have preference over private shipments. Such were the conditions in March.

The winter was a very cold one in Siberia and the railroads suffered greatly from this and from the lack of coal which could not be delivered. When the weather became milder in March, the Omsk Railway Administration renewed its activities in re-establishing full service and also in rebuilding the railroad bridges which had been destroyed by the retreating Bolshevik and were recaptured by the Omsk government on its drive toward Perm and the northern part of European Russia. The organization of the Trans-Siberian railroad is as follows: There is in Omsk a Ministry of Ways of Communications with Mr. Oustrougoo, whose name I have already mentioned as Minister. He is also chairman of the Inter-Allied Committee for the Supervision of the Trans-Siberian Railways in the zone in which the allied military forces are operating. Under the control of the Inter-Allied Committee is a technical board with John F. Stevens as president. A Russian manager or director with other Russian officials remains at the head of each railway under the authority of the existing Russian law. In matters of a technical operation, the president may issue instruction to the Russian and other officials on the railroads and may assign, if necessary, corps of railway experts to the offices and the more important stations. The experts are chosen from the Russian Railway Service Corps, which is composed of American railroad men, sent to Russia in 1917. At that time there were 220 men under Colonel George Emerson, but the number has since been reduced to 150.

The Loan of \$20,000,000

The activities of the Interallied Committee began formally last February. Up to that time John F. Stevens, with Colonel Emerson and the men of the Russian Railway Service Corps, did practically the same work as is now being done by the committee. They were making use of the material we have shipped and of what they could get in Russia. Now a loan of \$20,000,000 is under consideration, to be extended by the Allies for purchasing material necessary for the upkeep of the Siberian Railways. As the railways are in good condition—many new locomotives and cars and spare parts for this new equipment are being shipped—the loan will help very materially to improve the situation by supplying the railroads with spare parts for existing equipment and with material for running trains. The situation will be relieved, I hope, during this summer, and this will help to accelerate the regeneration of Russia by way of Siberia; this was predicted by many Russians over a year ago.

The Railways of Bolivia

By Philip W. Henry

Vice-President, American International Corporation

The first railway connection of Bolivia with the outside world was through what is known as the Antofagasta (Chile) & Bolivia Railway, one of the best paying railways in South America, owned and operated by British capital, controlling practically the entire railway system of Bolivia, and terminating at Antofagasta, now one of the principal ports of Chile, but, prior to the war of 1879 between Peru and Bolivia against Chile, a port of Bolivia. One interesting thing about this railway is that its main line, extending from Antofagasta to Oruro, Bolivia, 573 miles, was constructed of 30 in. gage, and is still operated at that gage, although between Uyuni and Oruro, 195 miles, a third rail was placed several years ago in accordance with an agreement with the Bolivian government to adopt on that section the same gage (one metre) as the lines of the Bolivia Railway, which it had recently acquired.

Notwithstanding this narrow gage, the railway company has a very comfortable dining and sleeping car service. In

fact, from personal experience, I can testify that, for comfort in traveling, the through train between La Paz and Antofagasta, 718 miles, is equal to that of first class trains in the United States, although the running time is very slow, the schedule being 43½ hours up and 39½ hours down, with a through train running only once a week. This, however, is not uncommon in South America, for the through service three years ago when I made the trip between Buenos Aires and Santiago, Chile, was only once a week. Many trains are scheduled for two or three trips a week.

Rising 13,050 Feet in 223 Miles with

Only 2 Per Cent Maximum Grades

From a physical point of view the most astonishing thing about this railway is, that starting at sea-level and passing over a summit of 13,050 ft., 223 miles from Antofagasta, the grade is so regular that the maximum is only 2 per cent, and this pertains only to the first 18 miles out from Antofagasta, where the ascent in that distance is 1,800 ft. Beyond that to the summit there is almost a continuous grade of little more than one per cent. Another surprising thing is the fact that from Antofagasta to La Paz, 718 miles (with the exception of the last six miles) the grading was remarkably light, with few bridges over 100 ft. span, one of these being a high, but short viaduct, over the Loa river, 148 miles out from Antofagasta. I doubt if there is any railway in the United States of this length with so little grading and so few bridges, with no tunnels whatever.

Going into La Paz itself for a distance of six miles, with a drop of nearly 1,000 ft., there is some very heavy work, but on the other 712 miles the work is extraordinarily light. Another interesting feature is that for the first 200 miles it passes through territory which practically has no rain, and therefore the drainage problem is reduced to a minimum. As there is good ballast along the line, with practically no culverts or bridges, the maintenance of way gives little concern. Seventy miles from Antofagasta, at an elevation of 5,000 ft., the railway enters the nitrate district and continues for the next 30 miles. Of this material it carries a million tons a year (pre-war conditions) to Antofagasta, a haul averaging 87 miles, all down grade, for which it obtains \$1.82 per ton or somewhat over 2 cents per ton per mile. This, of course, is very profitable traffic, and one reason why the Antofagasta is one of the best paying railways in South America. The average earnings of the entire system, before the war, were around \$11,500 gross per mile with an operating ratio of from 50 to 55 per cent.

Next to nitrate in tonnage comes coal carried from the seaboard to the interior, and then come ores of silver, copper, tin, bismuth, tungsten, antimony, with such general merchandise, supplies and machinery as are needed for the railways, nitrate plants, mines and for personal consumption.

Although the freight rates over this railway (2 cents per ton per mile) and over all the railways of South America, are considerably higher than in the United States, passenger fares are no higher, and as there are second class cars, people can travel for less than in this country.

As Antofagasta and the country through which the railway runs for 200 miles is practically without water, the railway was forced to develop not only a supply for itself, but also for the industries and towns along its line, as well as for Antofagasta, a city of 70,000 population. The railway is therefore bringing water 193 miles to Antofagasta from an elevation of 10,700 ft. This water being somewhat brackish, it was necessary to go still further, 229 miles, to an elevation of 14,500 ft., in order to find suitable drinking water to supply the towns and industries along its line. Incidentally, the furnishing of water is quite profitable to the railway.

The construction of this railway, like so many of those

of the United States, was a matter of development. It was first projected to reach the nitrate fields, which it did in 1874, when 72 miles were constructed. From the nitrate fields, it was extended 378 miles from Antofagasta to Uyuni, Bolivia, in order to reach the very rich silver mines at Pulacayo near that city. The final extension came in 1892 when it reached Oruro, 573 miles from Antofagasta, the center of the principal tin district of Bolivia. Its further extension to La Paz was through its acquisition in 1909 of the Bolivia Railway, an American corporation, formed in 1907 to build a system of railways for the Bolivian government; and this brings me to the construction of this system, which reflects so great credit upon the Bolivian government which, in its settlement of a boundary dispute, received \$10,000,000 from the Brazilian government. With this sum as a nucleus, the Bolivian government, under the presidency of General Ismael Montes (now the delegate of Bolivia at the Peace Conference, and one of the great statesmen of South America) decided to develop a system of railways which would bring La Paz, its capital, in touch with the outlying departments and afford means of transporting the minerals which so abound in that country.

Comprehensive Development

It must be understood that in many undeveloped countries it is impossible to interest private capital in the construction of railways without some kind of a government guarantee or subsidy. The conditions in those countries are usually quite different from those in the United States where the population is apt to follow the railway without much urging, and the resources along the line are quickly developed by private capital. In countries like Bolivia where the population (2,500,000, of which the great majority are Indians, in a territory more than twice the size of Texas) is scattered, with little attraction for immigration, the building up of the country is of very slow growth, so that the economic features of railway construction give way to those of political importance. For political reasons it is necessary to have transportation between different parts of the country, and particularly so is this true of Bolivia, where the white population is sparse and where there is no one city of great size. With the knitting of the country through railway construction, the national feeling is intensified and the dangers of revolutions diminished.

The Bolivian government, having decided on a program of railway construction, entered into negotiations in 1906, through its minister in Washington, with certain American bankers, by which the latter agreed to put up \$15,000,000 for which they would receive first mortgage bonds of the railway, interest guaranteed for 20 years by the Bolivian government, which in turn agreed to put up its \$10,000,000 cash for which it would receive income bonds. As a result of this agreement, all of this money, and in fact more, totalling \$35,000,000, has been spent, with the result that today the three important commercial cities of Bolivia, Oruro, 25,000 population; Cochabamba, 30,000; and Potosi, 30,000, are connected with the capital, La Paz, 90,000 population, and with the outside world; and upon 60 miles of new construction, La Paz will be united with Buenos Aires, the capital of Argentina, 2,300 miles distant, forming the longest link south of the Rio Grande, in the much talked of Pan American Railway. For this latter piece of construction, the Bolivian government now has a representative in New York, trying to raise the necessary money, as all the funds under the former agreement have been expended.

From American to British Control

I might state, however, that all these funds were not expended by the American bankers. Soon after this construction program was under way, it occurred to the Antofagasta

Railway, which up to that time had dominated the railway transportation of Bolivia, that the Americans might make serious competition if allowed to complete this new system of railway. It therefore entered into negotiations with the American bankers, who, with consent of the Bolivian government, sold out to the Antofagasta interests. This was after the first line from Viacha to Oruro, 125 miles, had been built. While to Americans in general and to myself in particular—for I was president of the company formed to construct this system of railways—it was a disappointment to see American capital retire from the Bolivian field, it was really better that the work should be done by such a strong organization as the Antofagasta Railway, which could afford to operate these lines of low earning capacity until such time as they were able to pay their own way. It was also able to advance funds beyond the original agreement, which another company depending entirely upon its Bolivia business could not afford to do. Even now, the Bolivia Railway is earning less than half of the interest charges on its first mortgage bonds, but the government has promptly paid the balance. During the past two years gross earnings have nearly doubled owing to the war demand for tin, copper, tungsten, silver and other metals in which Bolivia so abounds. While under post-war conditions earnings may fall, it is not likely that they will reach the low figures before the war, as additional mines have been developed due to high prices, and Bolivia, with its greater buying power, will need more goods from the outside world.

As a result of the contract of 1906 made with the American bankers, assigned later to the Antofagasta Railway, the following lines have been constructed:

	Miles
Viacha to Oruro, opened in 1909.....	126
Rio Mulato to Potosi, opened in 1913.....	108
Oruro to Cochabamba, opened in 1917.....	127
Uyuni to Atocha, opened in 1913.....	55
Total	416

In addition, the Antofagasta is operating its own lines in Bolivia from

	Miles
Ollague to Uyuni, opened in 1889.....	107
Uyuni to Oruro, opened in 1892.....	195
Viacha to La Paz, opened in 1918.....	20
Total	322
Total miles controlled by Antofagasta Railway.....	738

Outside of the Antofagasta interests, there are three other railways in Bolivia:

1st.—The Guaqui & La Paz, 59 miles, operated by the Peruvian Corporation, connecting the capital with Lake Titicaca (elevation 12,500 ft., the highest body of water in the world on which steamers are regularly operated), whence a line of steamers connects with the Southern Railway of Peru with an outlet on the Pacific at Mollendo;

2nd.—The Arica-La Paz Railway, finished in 1913, owned and operated by the Chilean government, 278 miles in length (of which 149 are in Bolivia), connecting the capital with Arica, Chile, and affording the shortest route to the Pacific;

3rd.—The line, 25 miles long, running southeast from Oruro, serving a tin district and built and operated by private Bolivian capital.

As a total, therefore, Bolivia has within its border 971 miles of railway linking up such important points as Ollague, Uyuni, Oruro, Potosi and Cochabamba with the capital and affording an outlet to the Pacific at three different points, Mollendo, Arica and Antofagasta. The completion of a contract now under way between Tupiza and the Argentine border for 60 miles, and a new construction contract for a like amount between Atocha and Tupiza will give Bolivia an outlet to the Atlantic at Santa Fe, Rosario and Buenos Aires, and will afford an interchange between the mineral products of Bolivia and the agricultural products of Argentina.

Not all of these lines are like the main line of the Antofagasta Railway in finding so few natural difficulties to overcome. That to Arica has 10 per cent of its length in track railway of 6 per cent grade. That to Cochabamba descending from the plateau to the watershed of the Atlantic has experienced great difficulties with washouts brought about by storms, infrequent but approaching in intensity to cloudbursts.

Practically all of these railways in Bolivia are at an elevation of 12,000 ft. and over, lying in the great plateau between the eastern and western ranges of the Andes. The line to Potosi crosses the divide at an elevation of 15,814 ft., said in Bolivia to be the highest point reached by any railway in the world, but really exceeded by the line to Cerro de Pasco, Peru, where the elevation is 15,865 ft., 51 ft. greater.

The Conduct of Railway Enterprises

in Foreign Countries

Having thus discussed specifically the railway situation in Bolivia, it may be in order to say something about the conduct of railway and other enterprises in foreign countries. In this I have been fortunate, for 25 years ago, while general manager of a large paving company, I was called upon to send an organization to lay the first asphalt pavements in Buenos Aires. From that experience I have deduced certain principles about carrying on work in foreign countries, from which I have profited ever since.

In order to carry out this contract in Buenos Aires, we sent a complete organization made up of a superintendent to take charge of the work, a competent accountant to take charge of the office, with various foremen to look after the grading, concrete, laying and mixing of the asphalt, as well as laborers skilled in the art.

It soon developed that many of those men were unadaptable, became dissatisfied, so that in time most of them returned home. Meanwhile the superintendent had been breaking in local men, so that within three or four years, the only Americans remaining on the job were the superintendent and chief accountant, all the other positions being filled acceptably by men found locally. Not only did this result in a less expensive, and just as efficient an organization, but it created a friendly sentiment with those with whom we were doing business. Naturally in all countries, there is a prejudice against foreigners and it is advisable to use local talent as far as possible. At the outset it may be necessary to have an organization of Americans, but later on it will be found, that with a few Americans at the top, the balance of the organization can be made up locally.

The same experience met me in Haiti some years later in operating a railway of which I was president, when we found that a native locomotive driver gave just as good service as a much more expensive white man from the States. An American master mechanic, however, was found indispensable, and in fact where initiative and executive ability are required, an American may be necessary. In recent railway and canal surveys in China, with which I have been connected, the only Americans have been the chief engineer and chiefs of parties, all the others, including instrument-men, being Chinese.

Another point should be emphasized, and that is to consider not only the technical qualifications of the men sent to the foreign field, but more particularly their temperamental qualities. Very often the strong energetic type of American, who does so well in this country, does not fit in so well with the people of other countries. It is especially dangerous to send a man, no matter how great his technical ability may be, who regards the inhabitants of the country to which he is sent as "dagoes," as I have heard more than one American say. Unless the American really feels in his heart that he can do business with these men as equals, it

would be better for him to stay at home. While we may admit that the point of view of those of other countries may be different from our own, and while they may lack certain qualities of business energy and judgment in which we take pride, they are more than likely to excel us in other qualities which, outside of business, may be more worth while than our own.

Another important point is to spend a great deal of time and thought in picking out the man who temperamentally and technically will fill the position, then, after outlining your general policy, give him full authority to handle local problems. If you are not willing to trust his judgment in such matters, better not send him—or, better still—confine your energies at home and let some one else tackle the foreign field. My experience has taught me that on local problems the judgment of a mediocre man on the ground is worth more than that of the most talented man in New York, who is more than likely to form a judgment based on conditions which exist only in his mind, while the judgment of the man on the spot is based on conditions which actually exist.

American Leaders in South

American Railway Development

Reverting to the prominent part played in the past by Americans in foreign development, one is surprised to see in Valparaiso, Chile, a monument in the business section to an American, William Wheelwright; and in going to Argentina we find another monument to the same man. Upon inquiry, we find that this American was a native of Newburyport, Mass., born in 1798, shipwrecked on the Argentina coast when 28 years of age and prominent later in the development of Argentina and Chile. He was the founder of the Pacific Steam Navigation Company, recently acquired by the Royal Mail Steam Packet Company, and built the first important railway line in Argentina extending from Rosario to Cordoba, 246 miles, commenced in 1863, completed in 1870. Earlier than that, in 1849 he built a railway in Chile from Caldera to the coal mines at Copiapo, the oldest, with one exception (in British Guiana), in South America.

Another American, famous in the railway building of South America, was Henry Meigs, born at Catskill, N. Y., in 1811, who began his South American career by finishing in 1863 the line between Valparaiso and Santiago started by Wheelwright a few years earlier. Then he undertook in 1870 the construction of the Oroya (now Central of Peru) Railway, which reaches the highest point in the world, 15,865 ft., only 106 miles from the seaport of Callao. Under the stress of carrying on this great work, Meigs died in 1877, four years after Wheelwright, leaving the completion of the line to William Thorndike, another American.

These men worked with European capital—a condition not possible at the present time. The future activity of Americans in the foreign field of construction and development will therefore depend upon American capital, which in turn will depend upon the attitude of the American investor.

The Necessity for American Investments

It is not the province of bankers to make permanent investments. Their function is to furnish the initial money and take at first hand securities which may be issued in payment of any construction which is done. Unless the bankers in turn can sell these securities to the private investor, they will soon come to an end of their available resources, and the work of construction will soon come to an abrupt end. The investor must therefore be educated to believe that there are foreign securities of just as true value as those of our own country, especially when brought out by bankers of good standing. Not only will these foreign securities afford a profitable field for investment, but the con-

struction and operation of these properties will afford a favorable market for our manufactured products. The railways owned by British capital in South America have been great absorbers of their manufactured goods. In fact, such railways seldom, if ever, even ask for American bids. In this connection, it is interesting to note that a company, of which I have knowledge, under American ownership bought all its materials and equipment in the United States; under British ownership it bought them in England. Also the American engineers and operating men who were employed at the start were soon displaced by English. This is not said in criticism, but only to emphasize the fact that business follows investment—whatever may be its position with respect to the flag.

The Railways of Japan

K. Yamaguchi

Resident Representative, Japanese Government Railways

Japan is far apart from here geographically, separated by the Pacific Ocean, but industrially and economically the United States and Japan are very closely related, and it seems to me as though there were no ocean dividing us.

In 1872 the line between Tokio and Yokohama, the mileage of which was about 17 miles, was constructed, managed and operated by our government. In the years following, many other lines were constructed throughout the country, some operated by the government while others were run by private companies, their total mileage being in 1906 approximately 5,000 miles.

In the course of time we began to feel the difficulties naturally arising from the two forms of management, there being lack of unification and various complications. After close investigation the government finally took over the main lines of the country through the passage of a bill by Parliament in 1906. By this new law the government purchased 17 lines which had previously been owned by private companies, running through the main parts of the country, leaving a few branch lines to private companies. At present the total mileage of government lines is about 6,082 miles and about 1,200 miles are under construction, the mileage owned by private companies being 1,916 miles.

Besides those there are in Formosa, Manchuria, and Korea, 2,383 miles of line, but these are controlled by their own governor general and are not included in the details which follow.

We have on the railways of Japan itself 2,917 locomotives, of which 700 are superheated, and 62 are Mallet articulated locomotives, the heaviest being 95 tons. Passenger cars are classified as first, second, and third class, and we have also sleeping, dining and observation cars. The total number of passenger cars is about 7,058; nearly half have bogie trucks, the other half being four-wheeled cars. All new cars, however, are to be of the bogie type.

As to freight cars we can boast 47,570, the capacity of 15-ton cars being our standard. They are nearly all four-wheeled, but there are some coal cars having a capacity of 24 tons of all-steel construction and with bogie trucks.

The Japanese islands being mountainous, it is somewhat difficult to construct railroads, and we have been obliged to build many tunnels and bridges. It is therefore impossible to make straight roads. The sharpest curve on the main lines is 15 chains (nearly 10,000 ft. radius), and the steepest gradient is 1 in 40 or 2.5 per cent. The gage of our railroads is 3 ft. 6 in., and the rails are 60 lb. usually, but we also have 75 lb. rails on heavy traffic or mountainous lines, and these rails are to be put in general use.

We use the chain and screw couplings, except on Hokkaido Island. That island being 60 miles from the main island

the automatic center couplers were originated there and have continued to be used after the American practice. We have found these automatic center couples much safer and more economical and I am glad to inform you that we are going to place them in operation on all lines instead of our former chain and screw couplers.

Owing to Japan's industrial development our railroads were pressed by extraordinary increasing traffic and to meet these demands we have been forced to increase the supply of cars and locomotives and make vast improvements in our roads and terminals.

Last year we purchased 150 locomotives, 2,500 freight cars and 200 passenger cars, all of which were built in our own country. Unfortunately, it was not possible for us to secure all the necessary materials for construction and improvement of roads, terminals and repairs of equipment, so we recently made purchases in this country amounting to about \$10,000,000.

We are always endeavoring to improve our management and operation in general in order to keep transportation facilities adequate to the development of the country. To gain this object our government railways despatch every year several officials and engineers to this country and Europe for the purpose of investigating and studying railroad systems and management.

Important Revision of M. C. B. Rules

THE PROMULGATION of circular No. 37 by the Mechanical Section of the American Railroad Association was briefly noted in the *Railway Age* of May 16. The text of this circular is as follows: "This circular re-establishes delivering line responsibility and the practice of defect carding as between roads under U. S. Federal Control, and all circulars and interpretations to the contrary are hereby abrogated.

"In view of United States Railroad Administration Accounting Division Circular No. 86, issued April 15, 1919, effective the date of that circular, Articles 1, 2, 3 and 4 of the 1918 Code of M. C. B. rules for freight cars and modifications A to C, inclusive, of the 1918 Code of Rules for Passenger Cars are hereby abrogated and the following will apply to railroads under U. S. Federal Control:

"To the end that interchange inspection work may not be duplicated under U. S. Federal operation of railroads, so that more repair work and less unnecessary inspection will result, it is ordered—

"(1.) That joint arrangements shall be made to prevent such duplication in inspection by arranging all inspection forces at interchange points with a lead or chief joint inspector as conditions require, to supervise the forces and see that inspection and repairs are properly made to car equipment.

"(2.) M. C. B. Rule 2 is modified as follows: (a) Loaded cars offered in interchange (except those having defective safety appliances) must be accepted by the receiving line which may either run, repair or transfer lading from car; (b) the repairs to car or transfer of lading is to be done by the railroad having facilities nearest available. If facilities are equally available by both railroads, the car will be moved to facilities located in the direction car is moving.

"(3.) If car is shopped for repairs due to: (a) old defects that existed before car was loaded; (b) lading requiring transfer or readjustment, account of not being in accordance with M. C. B. loading rules; (c) overload requiring transfer of lading; (d) not being within clearance dimensions over route it is to pass; (e) not meeting A. R. A. third rail clearance. In each case above mentioned, the facilities

nearest to car will be used in making repairs to car or transfer of lading.

"(4.) Should the location of facilities require a receiving line to make transfer or readjustment of lading, the cost of such transfer or readjustment of lading will be billed against the delivering line as per Rule 2 of the 1918 Code. The chief joint or lead inspector will make report and forward to the head of the mechanical department of both railroads, showing all cars transferred or shopped for old defects, whose duty it will be to impose discipline for willful and inexcusable violation of the M. C. B. rules of interchange and loading rules, the same as instructed in Director General's Order No. 8 for the violation of the safety appliance law.

"(5.) Cars, whether loaded or empty, having safety appliance defects will have such defects repaired immediately upon discovery and will not be offered in interchange. If necessary to move car to shops for repairs of safety appliance

defects, it must be moved to shops of the company upon whose line it became defective.

"(6.) Empty cars offered in interchange, if in safe and serviceable condition, must be accepted.

"(7.) Bad order cars which previously had been delivered in bad order under load must be repaired by the road making transfer, if they have facilities and material; if not, the nearest repair point on any line, having material and facilities, should make the repairs.

"(8.) Owners must receive their own cars when offered home for repairs at any point on their line.

"Rule No. 92 is amended to read as follows: 'In rendering bills cars shall be treated as belonging to companies or individuals whose name or initials they bear, except that bills for repairs to leased cars or cars of other ownership shall be rendered direct if so directed in the billing instructions in the Official Railway Equipment Register.'"

The Menace of a Concentrated Buying Power

The Secretary of Commerce Discusses the Effects of Railway Purchases on Industry

By William C. Redfield

I SOMETIMES THINK of buying power as a force which *can* be used constructively, *is* commonly used with regard confined wholly to the immediate transaction, and which *may* be used destructively. Would not a great industry do well to use its purchasing power to develop new sources of supply, either looking to the increase of production of the articles it needs or to the development of satisfactory substitutes, or to making the certainty and security of its supply sure beyond doubt? Is it not possible to so extend the science of buying that it shall become a promotive force?

Out of the helpful experience the nation has had during the war and the readjustment period with government operation of our great systems of intercommunication, whether on sea, land or by wire, a fact has clearly emerged which has peculiar interest for this assembly and which points a finger of warning for the whole country. I do not recall that this special phase of government control of communication of all kinds was seriously discussed prior to the war, yet to my mind it is of basic importance. It has by itself settled my own judgment adversely to government operation, in a country as large as this, of the great enterprises involved in our railways, our merchant marine, and our telegraph and telephone systems. I have called our experience helpful because through the work of the able and conscientious men who have handled all these activities more has been learned of the essential factors of the problems than was possible by pure theorizing. Nor is there in the background of my thought the smallest element of controversy. I wish to express my full confidence in the honor, uprightness, and conscientiousness of gentlemen with whom I have recently differed. They acted as they believed was right and wise and are so to be esteemed and regarded. That water has run under the mill. Nothing in what follows has reference to recent discussions or is to be interpreted save in the most cordial spirit of good will. I firmly believe that throughout the gentlemen from whom I differed acted with an eye single to the public good and without undue bias of any kind, political or otherwise.

The factor of which I speak is the necessary combination when under government direction of so large a part—a controlling part—of the purchasing power of the country into a

few hands or, regarding the government as a unit, into one compact control. The various transportation elements named include as I have said a controlling purchasing power over our industries and through them over our labor and our producers of raw material. It would lie in their power to injure or even destroy not one but many industries simply by either refusing to buy or by delaying buying at a critical period or by insisting upon impossible prices, or impracticable terms. Most business men will, I think, agree that it might make relatively little difference to industry who administered the laws or even what the nature of those laws might be if power over the life and death of industry lay in the hands of a few men because of their ability to purchase or to refuse to purchase its output.

This power, which is not so much by purpose as by its very nature autocratic would be peculiarly difficult to reach and control by law because it is impracticable to regulate by statute when or how buying must be done. Procedure can indeed be fixed. Publicity can be provided and competition secured in form. The danger suggested, however, comes not from paying excessive prices but from the reverse, from forcing by the pressure of enormous buying power prices, terms, and conditions of such a character as substantially to put our industrial fabric into the hands of masters of almost imperial power. Let there be given any one of you ability substantially to control one-third or more of the coal purchases of the United States through your predominant power in buying fuel and that industry becomes plastic in your hands. Let there be placed in the hands of another of you the power to purchase from one-third to one-half or possibly more of the products of the steel industries or of certain portions thereof and that industry becomes your servant, to do substantially as you will. The same is true of other great industries like copper, the shipyards and the builders of machinery. It will, I am sure, become clear to your thought after reflecting upon the incidental creation through government operation of a unified buying power that there would be established an enormous force so mighty as to work its will with industry and labor and to make them its creatures. It is not assumed that there would be intent to do harm. The reverse is undoubtedly true. It may indeed be taken as certain that as in the past and present

*From an address before the Purchasing Agents' Association of New York, Hotel Pennsylvania, New York, May 20, 1919.

so in the future conscientious and careful men would do the work. Ruin, however, can well be wrought by want of thought, by absence of social vision, by incomplete knowledge, by partisanship—involving either a party or directed to a service or a person, by the sense of irresponsibility arising from possible brief tenure of office or by the loss of balance arising from the intoxication of power. Years are not required to cripple an industry. It can be done in months or even weeks. There seem to be involved, also, the principle of democracy in commerce as against autocracy, with all that both imply, and the deeper one's thought goes into the matter the more one questions whether there would not be created an empire within the state which, however free in form the state might be, would of necessity control it from inside.

Consider the position of an industry that strove to be independent under such conditions. The circumstances are not frequent in which trade conditions are such as to constitute for a long period what is known as a seller's market. More frequently it is the case that the seller is more or less of a suppliant and the buyer has a great deal to say. We may not assume, on the contrary, that conditions always favor a buyer's market but there is commonly an intermediate state between the latter condition and that in which everything favors the seller; there is a middle ground in which the seller is far from being free from need and in which the buyer has a potent force. If a single purchaser uses one-half or nearly one-half the entire output of an industry and that purchaser refrains from buying for reasons that are satisfactory to him, where is your individual producer to find his market? Clearly the fraction of distributed purchasing power that remains must be divided over the entire industry, and so far as competitive conditions may prevail this means that quantity production on any continuous basis is impossible and that the high-cost producer, that is to say usually the smaller producer, must go to the wall. It is interesting to think what your position as buyers would be under such conditions.

Few would on reflection venture to favor the creation in this country of a condition in which such absolute power could be exerted over industry and therefore over the employees of industry as would be the fact if the government held in its hands the power to buy for the railroads, the merchant marine, the telegraph and the telephone systems and possibly other factors of our industrial life. Here would be in outward form what one might think a socialistic condition which would in its normal operations tend to become an imperialistic one. Here would be created a power within the state which might at any time exercise, even almost unconsciously exercise, a controlling power over it. The very existence of such a power would seem to involve the necessity of state-controlled industry in order that industry might be adequately defended against the state itself.

It throws light upon the possibilities that are suggested to read facts submitted by Mr. E. B. Leigh in his address before the National Industrial Conference Board in February last, in which he urges that railroad purchases measure general business prosperity.* His pamphlet is accompanied by a chart covering a period of 18 years which clearly indicates the relation of railway purchases to general business conditions and reaches the conclusion that:

"Our iron and steel industries have been developed to meet the railways' enormous requirements, and hence the railways have constituted the one industry whose purchases are upon such a scale as necessarily to affect the great barometer of iron and steel."

He proceeds to point out that buying is contagious and when initial buying takes place upon a large scale it stimulates greater buying. The current, as he suggests, proceeds out from the railways to car building plants, thence on to iron and steel plants and to the large number of railway supply industries. By these it is again directed to other in-

dustries which in turn influence a highly increased number of contributory interests, until the entire industrial machinery and the labor employed in connection with it have been set at work.

The possibility of favorable buying action thus existing in our railways becomes concentrated in the hands of a few when these great buying factors are unified under government control and this power becomes again enlarged if to it are added the other great operating systems which are today or have recently been under government management. It is evident that this power, mighty for usefulness, may be exerted either directly or merely by reason of its inaction as a destructive as well as a constructive force. In short, there here exists almost unnoticed heretofore a power before which the greatest trust is helpless, a controlling, restraining force in trade, beside which the greatest combinations are petty. It would be, or has been, country-wide, reaching into every city and by its infinite ramifications stretching out into substantially every industry and branch of commerce.

Furthermore, it is the fact that purchasing power even in free-acting corporate hands has operated not of course deliberately but none the less directly to cause serious injury to industry and so as to constitute within its sphere one of the fundamental bases of wasteful business practice. Continuity of operation in industry is essential to effectiveness and low cost. From the human standpoint it is more important still. It is essential to continued employment and to regular earning power on the part of labor.

An interesting illustration of the effect of large purchasing power on an industry appears in the chart which I am permitted to show you herewith. It is furnished by a large industrial concern and covers a period of 13 continuous years, from 1906 to 1918, inclusive, by calendar years. It shows the normal capacity of the plant in tons, the orders received in tons, the production in tons, and the number of men employed, and indicates the increase in cost arising from the fluctuation in orders placed by the railroads of the country, chiefly while under private control. The sharp fluctuations shown by the irregular exercise of purchasing power will be evident at a glance. Let us summarize a few of them. The increase of cost varies always upward with the decrease of orders. It rises in one case 25 per cent, in another 37.5 per cent, in another 86.9 per cent, in another 89 per cent. The force employed varies from 990 to 325, from 1,360 to 445, from 1,570 to 440; and rises as high as 2,110. The item of orders received shows most extraordinary peaks. It would not be quite correct to describe the line as showing curves; it is high summits and low valleys.

A brief study of this chart indicates the indirect but practical control of an important industry over a period of years by railroad buying under private auspices. It is not argued that that control is intentional. It may be freely admitted that it may have been meant to be helpful. It can hardly be denied that it is a fact. It would seem obvious that it would have been wise management on the part of the buyers to have so distributed their purchases as to provide a more reasonable continuity of operation with a corresponding decrease in the cost of the goods and more continuous employment for labor. This may have meant using reserve funds and accumulating reserves of materials. The difficulties involved in both are, of course, real, but the study of the results from the methods actually used makes it evident that the course followed was productive of waste, a waste hurtful to labor, injurious to industry and to the buyer alike. I am advised that the particular chart is typical of other industries as well as of the one to which it directly relates. There is a clear mutuality of interest between these buyers, these sellers, and the employees of both as well as the public which seems ignored and to develop which no provision is made.

It bears, however, more directly upon my theme to point out that if under private auspices the operations of separate

*Abstracted in the *Railway Age* of April 4, 1919, page 879.

railroad corporations did under private control exercise over the industries of the country so forceful a power as is shown in Mr. Leigh's pamphlet and by the chart now submitted to you, it follows as of course that if this power be exercised as a unit instead of separately and if to it be added other similar extensive powers, then a force is created the power of which over the industries of the country is so obvious as to need little explanation.

We ought not to leave the subject without presenting some considerations on the other side. For years prior to the war our industries with or without full knowledge exploited the railroads for their own benefit. We were favored with the cheapest freight rates in the world and even after advances were made that were strongly resisted our rates remained such as would have filled any competing European manufacturer with envy. A single illustration lies before me. One manufacturing concern which produces on both sides of the Atlantic paid a rate from Hull to London, 198 miles, of 16 cents per 100 lb. and in this country paid on similar goods a rate, from Buffalo to New York, 450 miles, of 16 cents. The same goods were, therefore, transported more than double the distance at the same price in this country. It has been perfectly well known to students of the subject for years past that American freight rates were the lowest in the world and yet our industries have resisted, not to say resented, any attempt at even moderate percentages of advance.

The trouble has been that the vision of the industries in this respect has been inward, not outward. They have, in this as in other matters, mistaken cheapness for economy and have not regarded sufficiently the real mutuality of interest between the transportation systems and themselves. They were keen, as respects their own goods, to obtain prices sufficient to carry overhead expenses, to amortize equipment according to due standards of depreciation, to provide working capital for necessary improvements, but they failed to recognize that the railroads were entitled to the same consideration of these matters as they themselves exacted in their own figures. It was thought wisdom to be suspicious of the railways and to disregard the candid and outspoken pleas of experienced railroad officers for sufficient income to maintain their borrowing power. For this suspicion a fearful price has been paid, for when the pressure came and the railroads were unable to meet it the whole country suffered.

It is the merest common sense to say that the shipper does himself wrong when he brings such pressure on the railways as forces it to operate at rates below those which will enable it to maintain its plant and its credit as the shipper is himself obliged to do. There is needed here a social sense, a business vision which shall go a great deal further than the personal purse or profits of the industry making the goods, as respects single or grouped transactions, and which shall take into account the permanent interests alike of the railways and the industries using them.

Final Valuation of the Winston-Salem Southbound

Single Sum as the Value of Property to Be Stated Later;
Exceptions to Tentative Valuation Considered

THE INTERSTATE COMMERCE COMMISSION has issued its final valuation of the property of the Winston-Salem Southbound Railway, after considering the protests of the carrier to the tentative valuation made by the commission's bureau of valuation, giving findings as to underlying facts upon which the commission will ultimately state a single sum as the value of the common carrier property of the company for purposes under the act to regulate commerce. The carrier and other parties may, if so advised, apply to be heard upon the undetermined question as to what sum shall be stated. Otherwise, in due course, the commission will state its conclusion and complete the final valuation.

The valuation is as of June 30, 1915. The investment in road and equipment after making certain adjustments is stated as \$5,598,999.65. The original cost to date of the property other than lands is stated as \$5,197,452. The cost of reproduction new as \$5,428,444 and the cost of reproduction less depreciation as \$5,033,875. The original cost of the lands is stated as \$401,547 and the present value at \$565,256.

On many points the decision follows the decision in the Texas Midland case, and an appendix to the report in that case is referred to for a statement as to the methods of valuation employed and as to the reasons for the differences between the cost values mentioned in the first and third paragraphs of the valuation amendment. The railroad operates 89.99 miles of road wholly within the state of North Carolina, single track with the exception of 3.02 miles. Its construction was financed by the Atlantic Coast Line and the Norfolk & Western, which on June 30, 1915, each owned one-half of all outstanding stock of the carrier other than directors' shares. An abstract of the report is as follows:

Original Cost to Date

The tentative valuation finds the original cost to date of the common-carrier property of the carrier, as of June 30, 1915, as follows:

Road, excluding lands.....	\$4,637,819
Equipment	293,881
General expenditures	222,296
	<u>\$5,153,996</u>

It is found in the tentative report that the original cost of carrier and non-carrier lands can not be stated separately, but the original cost of all lands is stated as \$401,546. The accounting report appended to the tentative valuation apportions the cost of lands upon a basis necessarily somewhat arbitrary, as follows: Carrier lands, \$372,189; and non carrier lands, \$29,357. The total original cost to date of the road and equipment, including carrier lands, is set out as \$5,526,186.

It is claimed by the carrier in its protest that the amount of original cost to date stated is less than should be shown by reason of the failure to include certain items of actual expenditure.

The amounts claimed for preliminary surveys and for the services of officers of the proprietor companies are not stated nor is the protest supported by evidence explanatory of such matters. It is shown in the accounting report that the carrier presented a claim that the survey in question was made in 1892, some 13 years before the carrier was chartered. It does not appear that the use of this survey saved any expenditure by the carrier; and it is conceded that the expenditure was made, not by the Southbound company, but by its proprietor companies. Many years have intervened since these claimed costs were incurred; they have never

become an account stated, although the proprietor companies have made settlements with the carrier involving reimbursement for millions of dollars advanced by them on its behalf. Nor, as far as this record shows, have either of the proprietor companies ever presented a claim against the carrier for any part of the sums stated. We see no reason to set aside the contemporaneous interpretation placed upon the transaction by the parties.

The carrier protests an adjustment of \$441.92 in respect to equipment retired, set forth in the accounting report. The adjustment made increased the amount of original cost claimed by the carrier, was not controverted upon the hearing, and is to be taken as correct.

The original cost figures contained in the tentative report do not include the cost of materials and supplies on hand, but the cost is stated separately as \$5,180.56. That amount represents the sum shown upon the carrier's records upon valuation date; but on that date the carrier in fact had on hand materials and supplies of a cost of \$43,067, of which \$37,886.44 had not been taken into the carrier's books of accounts. The carrier protests the tentative valuation in this regard; and upon the facts found as above stated, appropriate changes will be made in the tentative valuation.

The carrier and the bureau have agreed that the general balance sheet of the carrier shall be carried over into the final valuation; and this will be done. As the general balance sheet reflects what appears upon the books of the carrier, the amount of materials and supplies on hand will be shown therein as carried on the carrier's records, kept in obedience to the requirements of statute and the orders of this commission.

It is protested that the tentative valuation excludes any allowance for working capital, and that \$70,000 should be included for this purpose. Apparently the protest differentiates between working capital and material and supplies, which are often confounded or considered together in appraisals of public service properties.

The carrier's testimony is to the effect that it is necessary and desirable that the carrier should have on hand a sum of money as working capital, which it is claimed should be at least \$70,000.

The accounting report, which is a part of the tentative valuation, shows that on valuation date the carrier had on hand \$58,468.25. The character and amount of the carrier's other current assets also appears in the general balance sheet, which we will carry from the accounting report into the final valuation.

The tentative valuation, as herein amended, reports fully and sufficiently the facts with respect to the working capital of the carrier.

As modified the original cost to date will appear thus, fractions of a dollar being disregarded:

Carrier property (other than materials and supplies):	
Road, including lands.....	\$5,053,465
Equipment	293,881
General expenditures	222,296
Total carrier property.....	\$5,569,642
Noncarrier property, land.....	29,357
Total, carrier and noncarrier.....	\$5,598,999
Material and supplies:	
Carried on company's records.....	\$5,181
Not on carrier's records.....	37,886
Total material and supplies.....	\$43,067

Cost of Reproduction

Quantities and Unit Prices.—The carrier took numerous exceptions to the tentative valuation with respect to the matters contained in the estimate as to cost of reproduction now from which for the purposes of this statement lands are presently excluded and will be dealt with separately. While the case was upon hearing the respondent carrier and the bureau of valuation carefully reviewed these questions of

fact in conferences which culminated in agreement upon the major differences, and a joint recommendation to the commission that the matters so agreed upon be adopted in the final valuation. The agreement upon the part of the carrier was predicated upon the acceptance by the commission of the recommendation made; and the offer was coupled with a statement which would have been evident in any event that the adoption of particular unit prices for the respondent should not bind other carriers not parties to the record or require the commission to use such prices in any future appraisal of other railroad properties.

We are, of course, not bound by the admission or stipulation of the bureau, as the duty of ascertaining the facts with accuracy in this proceeding rests upon us; but we give proper weight to these recommendations of our bureau and the carrier, and as they seem fair we shall adopt them. The tentative valuation will be changed in accordance with the stipulation.

The written joint recommendation contemplates that as to Account 26, telegraph and telephone lines, the unit prices ultimately established for the Western Union Telegraph Company should be applied. However, the carrier conceded that the final valuation of its property should not be delayed and agreed to accept the conclusions reached by our bureau of valuation after conference.

Certain items in the estimate of the cost of reproduction new, excepted to by the carrier, were not covered by the joint recommendation, but are reserved for our consideration. These include the issues respecting railroad crossings, signals and interlockers, interest during construction, appreciation, depreciation and certain specific contingencies. The claims of the carrier as to development cost and working capital were likewise specially reserved for submission to the commission; the former will be discussed subsequently herein, and the latter has previously been disposed of under the heading, "Original cost to date."

Unit prices were determined by the bureau of valuation as of June 30, 1914, although the inventory was taken as of June 30, 1915. The present value of lands appears as of June 30, 1915. The carrier protests the use of quantities as of 1915, in connection with unit prices as in 1914.

The prices employed by the bureau of valuation are not the exact prices which were necessarily in effect upon the precise date, June 30, 1914, but were fixed with relation to that date in such a way as to produce normal prices for periods ranging from 5 to 10 years prior thereto. The use of such unit prices upon items entering into the cost of reproduction of road and equipment (other than land) will permit consideration of the carriers upon a uniform basis as to time, so that as the normal trend of prices of material and labor may go upward or downward correction factors can readily be applied from time to time, as by law required, to the end that all appraisals may be kept to date upon a comparable basis.

We can not shut our eyes to the fact that the effect of the breaking out of the European war was to demoralize the markets for labor and material, so that prices current on that precise date, June 30, 1915, or over a period of time which would reflect the effect of a war which has largely monopolized the labor and material market to the exclusion of private industry, can not in any sense be said to represent normal or fair values.

With respect to lands, however, as to which the cost-of-reproduction theory is not applied, the values of which do not fluctuate wildly with war, and as to which present value is the criterion, a different situation is presented, and we have employed values as of the date of valuation.

Railroad Crossings.—It is protested by the carrier that the tentative valuation omits certain items of property owned or used by the carrier. These are detailed as (1) property owned or used, constructed at the carrier's expense, such as

overhead crossings with other railroads, 50 per cent of the grade crossings with another carrier, and a certain spur and coal trestle, and (2) property owned or used, but not constructed at carrier's expense, of which the tracks and facilities of other carriers at certain points, equipment of other carriers, private car lines, etc., are specified.

As the Southbound company was the junior carrier, the expense of these crossings was wholly borne by it. In the tentative valuation all costs borne by the Southbound company have been included in the statement of original cost to date.

It has been the practice of the bureau of valuation to apportion the estimated costs of reproduction in accordance with any agreement as to ownership of property of this character which the interested carriers may make. Failing such agreement, the cost of reproduction estimates of the junior carrier omit, in the case of under-crossings, anything for the assumed reproduction of structures used entirely for the passage of the trains of the senior companies; but the cost of reproduction estimates of every junior carrier includes the estimated cost of reproducing the property exclusively used by it. One-half of the estimated cost of reproducing property commonly used by both carriers, such as crossing frogs, is carried into the tentative valuation of the Southbound company. Such practice has been followed in the tentative report in this case.

The carrier contends that if it be assumed for purposes of determining the cost of reproduction that other railroads exist as of valuation date, then as a matter of theory it must be assumed that the identical structures which the Southbound company as the junior carrier was obliged to construct would likewise have to be constructed in reproduction.

The method followed in the tentative valuation does in fact contemplate the assumed existence of the railroads as crossed, and gives full credit in the cost of reproduction estimates for whatever is shown to be owned by a carrier, or occupied and used by it, while showing, as a historical fact for whatever it may be worth, the expenditures in fact made by the carrier in original construction. The method commends itself as involving the minimum of conjecture, and as the only plan which in all its aspects is feasible and certain in practical application.

In *Texas Midland Railroad, supra*, we have considered the treatment of property used but not owned, and of industrial tracks constructed in part only by the carrier. Claims of the second class specified are disposed of in the present case in conformity with the principles we there announced.

Certain changes have been made by us in the quantities and prices under Account 15, crossings and signs, and Account 16, station and office buildings, to carry out the joint recommendation of the carrier and the bureau that the claims of the carrier should be checked by the bureau and the results accepted by the commission.

Contingencies.—The carrier concedes that as its line is new a blanket allowance for contingencies such as is often claimed is not necessary; but it contends that several items of cost which were incurred in construction were not included in the estimate of cost of reproduction new. All these items are included in the report as to original cost to date. The general nature of the contingencies for which claims are made may thus be stated:

(1) Amounts paid the contractor for a release of contracts when, after construction had begun, the manner of doing the work was changed; (2) disputed items of yardage not calculated in certain cases; (3) yardage of earth rehandled because an apparently suitable borrow pit, partially utilized, was found to be unsuitable; (4) change in alignment found desirable after work had been started on the location originally fixed; (5) grading commenced, but not completed, for connection with another carrier, upon

land owned by the carrier, the project being indefinitely deferred; (6) a trestle which was started for drainage purposes and which the carrier was afterwards permitted to fill. The protest also excepts to the omission to take into consideration as a necessary item in the reproduction program property which in fact was acquired in original construction but was abandoned by reason of proper and reasonable changes of plans due to changed conditions during construction. It is not contended by the carrier that all such items, so far as they relate to the construction of the carrier's property, are not taken into account in the statement of original cost to date.

Obviously it can not be assumed that in theoretical reproduction of the property these contingencies would occur, and no sum should be included in the estimate of cost of reproduction new in the valuation, because of such past occurrences. See *Texas Midland Railroad, supra*.

Appreciation.—It is protested that the tentative valuation fails to include appreciation as an item necessary to be considered in any rational method for the reproduction of the carrier's property, and that the minimum amount which should be included therefor in estimating the cost of reproduction would be not less than \$32,400. No specific evidence was introduced in support of this claim. However, the carrier was permitted to make of record herein the general evidence which was before us in *Texas Midland Railroad, supra*, and certain other proceedings as to appreciation of roadbed.

The character of appreciation in roadbed claimed by the carrier, as shown in the record, is the equivalent of an overcoming of depreciation in roadbed items. We have reported the various items of roadbed substantially without depreciation, although, by the processes for which the carrier claims an allowance, the original or ideal form of the roadbed has been considerably altered. In not depreciating roadbed we have, in fact, taken into consideration the effects of these processes of operation, the lapse of time, and the elements, which the carrier terms appreciation. Again, what the carrier claims as appreciation can not be produced merely by the expenditure of money, and therefore can not be reproduced new. We have already pointed out that the valuation amendment contemplates the ascertainment of the cost of reproduction new, and not the cost of reproduction in the present condition.

For these reasons, and for the reasons already stated in *Texas Midland Railroad, supra*, no separate sum can, in this case, be stated as representing the value of appreciation.

Interest During Construction.—The carrier protests that the engineering program for reproduction, adopted as the basis for the tentative valuation, is too short. The length of the construction program assumed bears directly upon the amount which is to be included in the reproduction estimates for interest during construction. The following sums show in contrast the amounts reported in the tentative valuation under Account 76, interest during construction, and the claim of the carrier:

Tentative valuation:

Original cost to date (interest on expenditures for lands included)	\$163,358
Cost of reproduction new (lands excluded)	277,475
Cost of reproduction less depreciation (lands excluded)	259,103
Carrier's protest:	
Minimum claim (lands included)	413,170

This railroad has a main line about 88 miles in length, with a branch approximately 2 miles long. The carrier claims two years and three months as the construction period from the letting of contract to the beginning of regular operation. Construction was in fact completed in about two years. It appears from the record that except for reconnaissance and preliminary surveys, for which nine months was estimated as necessary, the road could be constructed, from the letting of contracts to the putting into operation,

within two years. Certain minor construction would be carried on after regular operation was commenced, such as the laying of permanent ballast, and the erection of some minor buildings and laying down of industrial tracks. But railroads are regarded as completed for operation, for all practical purposes, in advance of such construction, and we so treat this carrier.

The interest shown in the reproduction estimates in the tentative report was reckoned at 6 per cent for one-half of the construction period assumed by the engineers of the commission, upon road Accounts 1 to 48, inclusive (except 2, 39, 40, 41 and 42), and upon general expenditures Accounts 71 to 75, inclusive, and 77. Interest was computed on the equipment accounts at the same rate for a period of three months. The present record raises no question as to the rate at which interest has been computed.

Subsequent to the service of the tentative valuation, in view of the desirability of a railroad under construction having on hand a certain amount of money upon which to draw for its expenditures during such process, the bureau of valuation recommended that interest during construction should be computed upon the road accounts enumerated and general expenditures at the full rate for half the construction period plus three months. Equipment being usually purchased only when the road is practically completed interest was estimated in the tentative valuation for three months, and the recommendation of the bureau did not change this amount.

The construction circumstances surrounding the carrier's railroad are not in any respect abnormal, and, as modified by the acceptance of the recommendation of the bureau, the estimate for interest contained in the reproduction estimates in the tentative valuation is ample.

No interest has been included in the reproduction estimates contained in the tentative report on account of the cost of land. The non-allowance of interest on the present value of land in the reproduction estimate conforms to the holding of the Supreme Court in the *Minnesota Rate Cases*, 230 U. S., 352, 455.

The disposition we have indicated as to the disputed items of interest conforms to our finding in *Texas Midland Railroad, supra*, and what was there said by way of discussion need not be repeated.

The protest questions the adequacy of the sum reported for interest in the statement of original cost to date in the tentative valuation, with respect to the omission of sums said to have been advanced by proprietor companies on account of road and equipment accounts, and certain expenses in connection with the acquisition of land and rights of way and in settlement of damages to abutting property. As is otherwise shown herein, the record does not support the claim as to the principal items mentioned and therefore does not warrant us in estimating interest thereon. The carrier's records, kept presumably in conformity with law and the requirements of this commission, contain nothing with respect to interest during construction on such items, and the carrier and the proprietor companies, while adjusting claims on account of advances amounting to millions of dollars, did not treat these particular matters as constituting a debt from the carrier to its proprietor companies. The protest in this regard is not sustained.

Development Cost.—It is contended by the carrier that in correctly estimating the cost of constructing, completing and equipping a going railroad there must be added to the cost of construction and assembling an amount to cover the cost of developing the business. Computations were presented which purported to show that after the road was opened to traffic in 1911 until the date of valuation, June 30, 1915, the results of operation had been a deficit of more than \$410,000, which deficit did not include all the interest actually paid. Computations were also presented on behalf of

the carrier made along the following line: For each of the years prior to the year of valuation, as of June 30, the total cost of the road to date was taken less the cost of new work done during the year, which gave the amount invested and in service during the whole of that year; the deficit from operations during the year was added to this sum, and on the total so obtained interest at 6 per cent was computed as representing the cost to the investors for each year. This item of interest, added to operating expenses, taxes and other expenses for the year, diminished by operating revenues and other income, gave a remainder which the carrier terms the real deficit for the year. The sums of the deficits for the year are computed for the years 1911 to 1915, inclusive, representing the total development cost claimed by the carrier, amounting to \$853,591. It is insisted that this figure must be added to the cost of reproduction, in order that the result will reflect the true cost of reproducing the property in the condition existing on valuation date.

The valuation amendment requires us to ascertain the cost of reproduction new, and not the cost of reproduction in any other condition. We should not overlook that by the method pursued by the bureau of valuation in ascertaining quantities, such costs during the early years of the enterprise as resulted in permanent increases to the property, are all discovered and taken into account. Additions to embankment, the widening of cuts, enlargement of ditches, etc., are examples.

It appears from the offer of testimony by the carrier as to development costs that all the data requisite to the computation thereof appear in the accounting report appended to the tentative valuation. In ascertaining the original cost to date of the property of the common carrier we have investigated and reported upon the history and organization of the carrier corporation, upon its net and gross earnings, and upon the expenditure of all moneys and the purposes for which the same were expended.

Our final valuation herein shows original cost to date, as well as the cost of reproduction new and the cost of reproduction less depreciation. It therefore embodies all of the underlying matters of fact, from which the carrier asks us to report a development cost.

Whether, in fixing a value for purposes under the act to regulate commerce, we should increase the cost of reproduction by the amount of deficit which the carrier may have incurred during the early years of the enterprise, will be a proper consideration when we come to state a single sum as value of the common-carrier property for such purposes. That question we leave intact. As stated, in the final valuation herein made we have the basic facts. The record herein shows no other values or elements of value.

Cost of Reproduction Less Depreciation

In the tentative valuation the cost of reproduction less depreciation was estimated by application of the same principles which were applied in *Texas Midland Railroad, supra*. Vigorous attack is made in the protest, in evidence, and in argument upon the soundness of those principles. We examined this question in *Texas Midland Railroad, supra*, and there sustained the soundness of the general theory employed in the estimate of cost of reproduction less depreciation. In the attempt to demonstrate the underlying unsoundness of the general theory of depreciation applied by our bureau of valuation, the carrier cited a number of instances in which it was claimed the methods employed gave incorrect results. We have examined these specific claims, and while they tend to show estimates somewhat different from those made by our bureau, the differences are not extreme, when adjusted to a common basis.

Certain changes in the tentative valuation will be made under this head, required by changes in the reported cost of reproduction new.

Lands

The protest excepts to a treatment of the lands of the carrier different from that given to other physical properties. The gist of the objection is that as to properties other than land the tentative valuation shows the original cost, and the costs of reproduction new and less depreciation, while as to land, what is termed a "present value" is reported, but no figures appear which represent the cost of reproduction.

It also is objected that the figures of present value were determined without reference to and without including the costs, damages and expenses that would be incurred in their acquisition. Numerous errors in methods and principles are alleged to have occurred in the determination of the present value. Among these errors the following are enumerated: (1) That the reported present value has been limited to the estimated unit of value for general purposes, not including railway purposes, of adjoining and adjacent lands, without taking into account the true value or actual cost of acquiring the same; (2) certain essential elements were not considered in the determination, e. g., the actual incidental costs of acquisition; rights which the carrier had to acquire, not measured by the value of a similar area of contiguous lands for general purposes; damages paid to original landowners by reason of the decrease of the rights of such owners and the increase of property rights of the carrier, such as severance and proximity damages, adaptability and availability of the lands acquired for then present needs; cost of buildings and other improvements; cost of removal and relocation of highways and other structures; and taxes accrued and assumed. It is protested that the recent experiences of the carriers generally in the acquisition of carrier lands, showing the amounts which carriers must pay in acquisition in comparison with the value of similar lands for general purposes, were not given consideration.

These protests raise the same question which was stated and decided in *Texas Midland Railroad, supra*, viz.: Shall the commission ascertain and report the present cost of condemnation and damages or of purchase of the carrier's lands? For the reasons stated in our report in that case, the tentative valuation herein, which bases the present value of lands upon the normal fair value of similar lands in the vicinity, ascertained in the manner employed and stated in the *Texas Midland Case*, must be approved in principle.

To abbreviate the record, it was stipulated that in the event the present cost of acquisition or reproduction cost of lands is to be ascertained and reported, certain multiples or percentages of present value as agreed upon should be applied. The disposition made of the principal question makes it unnecessary to give force to this stipulation.

In the carrier's protest exception is taken to the computations of the area of certain tracts of land, and to the classification of certain parcels as non-carrier instead of carrier. By agreement upon the hearing these matters were re-examined by the bureau of valuation, and as the carrier and bureau are now in substantial accord thereon the recommendations made by the bureau and accepted by the carrier will be incorporated in the final report. The protests of the carrier as to such matters will be treated as withdrawn.

As to the present value of lands, agreement has likewise been reached by the carrier and the bureau of valuation, and the carrier's protest is waived. The sums recommended are approved and will be included in the final report. The carrier's agreement as to these amounts does not, of course, waive its claim as to the ascertainment of the reproduction cost or present cost of acquisition of its lands.

There remain for our consideration the questions raised by the carrier's protest as to the omission from the tentative valuation of areas in streets, at grade crossings of public highways, at railroad crossings, and lands upon which industrial sidings are located. The same questions of principle

were presented by the protest of the carrier in *Texas Midland Railroad, supra*, and have been carefully considered by us in that case. For the reasons there assigned, the protest herein is not sustained as to the land areas the omission of which is protested by this carrier, and the principles applied in the tentative valuation are approved, except as to streets and highways, as to which the tentative valuation has been corrected in accordance with the rule in the case cited.

The formal order includes the following:

Investment in Road and Equipment.—The investment in road and equipment as stated in the books of the carrier on June 30, 1915, was \$5,598,557.73. By certain adjustments detailed in Appendix 2, this amount was altered to \$5,569,642.45, for road and equipment, including land, and \$29,357.20 representing miscellaneous physical property, viz., non-carrier land, a total of \$5,598,999.65.

Original Cost to Date, Cost of Reproduction New, and Cost of Reproduction Less Depreciation.—The original cost of property other than land owned or used by the carrier for its purposes as a common carrier, is shown in the sub-joined statement, which also shows the cost of reproduction new and cost of reproduction less depreciation.

The amounts of original cost to date may not in every instance represent the exact cost of property units now in place, as some renewals have doubtless been made.

	Original cost to date	Cost of reproduction	
		New	Less depreciation
Road, excluding lands.....	\$4,681,275	\$4,703,308	\$4,397,031
Equipment	293,881	292,165	232,626
General expenditures	222,296	432,971	404,218
Total	\$5,197,452	\$5,428,444	\$5,033,875

Reference will be made later herein as to the classification of such property in conformity with the classification of expenditures for road and equipment prescribed by us.

Cost of Lands, Rights of Way and Terminals at the Time of Their Dedication to Public Use, and Present Value of the same.—There can be no statement made showing the cost of the carrier and non-carrier lands of the Southbound company separately, without employing apportionments of costs which were incurred partly for one such class of property and partly for the other.

The following statement shows the original cost and present value of all lands, apportioning the original cost of lands as between carrier lands and non-carrier lands upon the relative area as constituting the best basis available:

	Acres	Original cost	Present value
Carrier lands:			
Urban	145,283	.....	\$347,394.02
Rural	1,280,269	.....	163,260.74
Total, carrier lands....	*1,425,552	\$372,190	\$510,654.76
Noncarrier lands:			
Urban	2,380	.....	\$34,531.50
Rural	326,152	.....	20,069.94
Total, noncarrier lands	328,532	29,357	†\$54,601.44
Grand total	1,754,084	\$401,547	\$565,256.20

* Included in the carrier lands are 273,223 acres acquired through aids, gifts, grants of right of way and donations, having a present value of \$63,398.27.

† The present value of noncarrier lands includes the value of any structures located on the lands.

Present Cost of Condemnation or Purchase of Lands.—Following the views previously expressed, no attempt is made to state what would be the present cost of acquiring either by purchase or by condemnation the lands of the carrier devoted to public use.

Physical Property Held for Purposes Other Than Those of a Common Carrier.—The amount, original cost, and present value of lands held for purposes other than those of a common carrier have been stated.

Materials and Supplies.—As shown in the general balance sheet, the value of the materials and supplies on hand is

shown by the carrier's records to have been, upon valuation date, \$5,180.56. The materials and supplies on hand, as shown by inventory, were of the value and cost of \$43,067, and the difference between the amount shown in the balance sheet and the carrier's records, \$37,886.44, was due to sums which had not yet been taken into account.

Aids, Gifts, Grants and Donations.—Certain carrier lands were acquired by the Southbound company through aids, gifts, grants of right of way, or donation. Such lands mounted in the aggregate to 273,223 acres, of a present value of \$63,398.27.

Other Values and Elements of Value.—No other values or elements of value were found to exist.

Appendices.—Appended hereto as Appendix 1 are the summary sheets and explanatory text showing the classification of the cost of reproduction new and cost of reproduction less depreciation above stated, in conformity with the classification of expenditures for road, exclusive of lands, and equipment prescribed by us. Appendix 2 hereto states the details as to the corporate and financial history, original cost to date, investment, capitalization, gross and net earnings, expenditures of money and purposes for which expended, of the carrier.

The engineering, land and accounting reports give the details respecting these figures and are on file in the bureau of valuation of the commission, open to public inspection, and subject to the direction of Congress, and such reports are referred to for greater particularity as to the matters herein stated.

This order will be supplemented by such further findings and order with respect to the value of the carrier property as may be deemed appropriate.

Portland Cement Production in 1918

COMPLETE STATISTICS of the output of hydraulic cement in 1918 compiled under the direction of Ernest F. Burchard, of the United States Geological Survey, Department of the Interior, indicate a marked decrease from the output in 1917 and show that the production of Portland and other cements in 1918 was the lowest since 1909. The shipments of Portland cement in 1918 amounted to 70,915,508 bbl., valued at \$113,153,513, compared with 90,703,474 bbl., valued at \$122,775,088, in 1917, a decrease in quantity of 21.8 per cent and in value of 7.8 per cent. The production in 1918 was 71,081,663 bbl., compared with 92,814,202 bbl. in 1917, a decrease of 23.4 per cent. The stocks at the mills increased from 10,353,838 bbl. in 1917 to 10,453,950 bbl. in 1918, or 1 per cent.

The average factory price per barrel for the whole country was \$1.596 in 1918, compared with \$1.354 in 1917, an increase of 24.2 cents, or 17.9 per cent. The prices in these two war years are the highest that have been realized for Portland cement since 1898 and 1899, when they were re-

Embargo Bureau of the N. W. Region

A PLAN has been instituted and put into operation in the Northwestern region for the distribution of embargo information which is an advance over methods previously used and is proving satisfactory to roads in this region. It will be recalled that the Car Service Section recently issued revised regulations in Circular CS-57 for the handling of embargoes, to become effective April 1. Briefly, they placed the issuance of embargoes under the direction of the regional directors, thus abolishing the zone embargo committees which formerly handled their distribution. The circular further stated that when embargoes have been approved by the regional director they should be transmitted by the regional director's office to all Federal controlled roads in the region, to the Car Service Section and to other regional embargo offices interested. The federal controlled roads in turn were instructed to notify their agents and the non-federal controlled roads which were assigned to them. In addition, the reason for each embargo must be stated, the embargo must be given an identifying number and a complete file of outstanding embargoes must be maintained at all freight loading stations for the guidance of the shipping public. These regulations made necessary the installation of a complete new system of handling embargoes, and in the Northwestern region the task of developing a workable plan was assumed by L. M. Betts, supervisor of car service.

The plan adopted for use in the Northwestern region has accomplished the dissemination of up-to-date embargo information in simple, compact form.

This was brought about by the compilation and publication of a monthly pamphlet containing in skeleton statement form all embargoes in effect on all railroads of the United States, Canada and Mexico that would be likely to affect business originating on railroads in the Northwestern region. The information is shown by roads arranged alphabetically in regional groups. Convenient reference is provided by an index both of the railroads involved and also of all local stations affected by the embargoes. Arranged in successive columns, the pamphlet shows information concerning the destination, consignee, commodity and gateway affected, together with a full statement of the exceptions that may apply. A sample entry is shown at the bottom of this page.

This pamphlet quite naturally would not answer the requirements of the Car Service Section as to the completeness of the embargo file at freight loading stations. To obviate this there was conceived, along with the method of issuing the bulletin of embargoes monthly, the plan of issuing a series of daily supplements. These supplements are mailed each night with a complete summary of all additions, cancellations and modifications received during the day, and sufficient copies are provided each road so they can be distributed immediately and directly to all local

PENNSYLVANIA RAILROAD, LINES EAST							
N. W. R. embargo number	Originating R. R. embargo number	Destination	Consignee	Commodity	Exceptions	Gateways	Reason for embargo
228-1-20	67-15	Brooklyn, N. Y. (Atlantic Terminal, Fulton Terminal)	All	All freight	None	All	Accumulation

A SPECIMEN FORM OF EMBARGO

spectively \$1.62 and \$1.43 a barrel. The lowest average price, \$0.813, was recorded in 1909 and 1912. The exports of hydraulic cement from the United States in 1918 were 2,252,446 bbl., valued at \$5,912,166, or \$2.62 per barrel, compared with 2,586,215 bbl., valued at \$5,328,536, or \$2.06 per barrel, in 1917. This represents a decrease in quantity of 12.9 per cent and an increase in value of 11 per cent.

agents without the delay and expense of reproduction. They are so arranged that additions and corrections can be clipped and inserted in their proper places in the current month's issue of the embargo bulletin, and thus with very little labor the record can be maintained up-to-date at all times. One of the most satisfactory features of the system is that, regardless of the attention paid by the local agent to the daily

supplements, there is placed in his hands on the first of each month a complete and up-to-date revision of all embargoes then in effect.

Telegraph transmission of important embargo changes is continued, but by reason of the prompt distribution to the local agents of the daily supplements it is possible to reduce the use of the wires to a great extent.

While the expense involved in printing and distributing the monthly bulletins and supplements is a considerable item, it has been more than offset by the savings made by roads in the Northwestern region in the reproduction and distribution of embargo information formerly received by them from the zone offices, and by the saving secured through discontinuing the zone embargo offices.

Progress is being made by the Car Service Section on a plan to consolidate embargoes applying via various roads to a common point. In lieu of half a dozen or more separate embargoes, identical in their provisions, from as many different roads, one embargo only, applying via all lines, is being issued. This plan is entirely practicable under the present system of handling embargoes by the regional directors, but could not have been installed under the former plan where each road issued and transmitted its embargoes without central supervision. It is expected that as the new system of regional direction develops it will greatly simplify the embargo situation, and thus reduce the annoyances and difficulties that have made embargoes one of the nightmares of the long-suffering railroad agent.

Doings of the United States Railroad Administration

Many Roads Badly in Need of Rail. When Is a Railroad Under Federal Control Question Before I. C. C.

WASHINGTON, D. C.

BIDS WERE RECEIVED by the Railroad Administration up to May 17 on 200,000 tons of rail, but announcement was withheld until Mr. Hines' return from his trip to the Southwest as to whether the prices quoted are more favorable than those of \$45 per ton for Bessemer and \$47 for open hearth announced by the Industrial Board of the Department of Commerce in March. The fact that no announcement was made has given an impression that the bids are not regarded as satisfactory, because the Railroad Administration needs the rail. While the records show that an average of approximately 1,500,000 tons of rail were used for renewals during the 10 years before federal control, and approximately 1,350,000 tons during the three-year test period, only about 1,100,000 tons were used in 1918 and the Railroad Administration has not placed any orders for rail since it took over the roads nearly a year and a half ago. While some of the orders were redistributed so as to make delivery to railroads whose companies had not placed orders, that practice was discontinued after January 1 this year and the steel companies have declined to deliver rails ordered by one company to other railroads. To take the rail after it has been delivered for use on another line is impracticable in most cases because of the difference in rail standards. Where different roads agree as to the rail section there are usually differences in the drillings. As a result, while the steel companies have been delivering rail this year at the rate of 35,000 to 40,000 tons a week, it is going to the roads which originally ordered it, and many of the roads which have not placed orders in advance are said to be badly in need of rail. On May 1 there were outstanding orders for approximately 435,000 tons, and three of the steel companies, the Carnegie, the Lackawanna and the Cambria, were out of orders.

Maintenance Problems Discussed

Problems connected with the 1919 maintenance of way program constituted one of the principal topics for discussion at a conference held at St. Louis on May 19 between Director General Hines, who has been making an inspection trip into the Southwest, and the seven regional directors. C. A. Morse, assistant director of the Division of Operation, in charge of maintenance of way matters, was also present at the meeting, which took up among other things, the available figures showing the rail and tie renewals in 1918 as compared with the test period and with the 10 years preceding federal control in connection with the requirements for this year.

The latest instructions regarding the preparation of the 1919 maintenance budgets are contained in a letter addressed by W. T. Tyler, director of the Division of Operation, to the regional directors in part as follows:

"I presume that in pursuance of the director general's letter of February 25 you have carefully studied the maintenance on each railroad for the test period and for 1918. Please have each federal manager as soon as possible submit to you the 1919 program for his railroad, on the basis that the maintenance of road and structures shall conform as closely as possible in the amount of labor and material used to the established average annual maintenance during the three year test period, but with regard to safe operation of properties under your charge, and to that end ask him to report promptly his program for calendar year 1919, divided as follows:

1. Number of ties.
2. Cubic yards of ballast.
3. Tons of rail and fastenings.
4. Value in dollars of ties, ballast, rail and fastenings renewals.
5. Value in dollars of renewals or necessary replacement of bridges, trestles or culverts.
6. Value in dollars of work necessary in connection with proper maintenance under present conditions of track, buildings, fences, ditches, signals, telegraph and telephone lines and other items of maintenance. The cost under this item to be expressed in one sum and generally should not exceed the average spent for the purpose during the annual average of the test period equated as to values of labor and material determined by each road."

When Is a Railroad Under Federal Control?

Some railroads were taken under the protection of the federal government; some railroads had federal operation thrust upon them; some were relinquished, and taken back, and several hundred other railroads do not know whether they have ever been under federal control or not. All these are some of the results of the President's proclamation of December 26, 1917, and the law of March 21, 1918, which were so worded that the several hundred think they know they were taken over but thus far some of them have been unable to make their convictions effective.

The questions as to who is to decide whether a railroad has been under federal control and by what process a final decision can most readily be reached became a perplexing problem at a hearing held before the Interstate Commerce

Commission at Washington last week on a petition of the Arkansas & Louisiana Midland, a railroad 102 miles long but apparently not a "system of transportation" as construed by the Railroad Administration, for the appointment by the commission of a board of referees to determine its just compensation under the federal control act. Incidentally the hearing brought out the fact that it is also a serious question how any of the several boards of referees already appointed by the commission may perform their functions as the comptroller of the treasury has ruled that the commission may not pay their expenses from any of its appropriations, and the Railroad Administration, the custodian of the revolving fund appropriated by Congress to defray the expenses of federal control, naturally is reluctant to pay the expenses of a board to decide how much it owes to a company which it claims it owes nothing.

The case presents a situation typical of that of a large number of the short line railroads, which, after having supposed they had been taken over, were relinquished by order of the director general on June 29, 1918, and now claim compensation as having been under federal control, while the Railroad Administration takes the position that no direct control was exercised over them and that they are not entitled to compensation. E. Ford, president of the Arkansas & Louisiana Midland, testified on Thursday that he had received and obeyed many orders from the Railroad Administration during the first six months of 1918, although he admitted that they had not required any important change in the operation of his road and that he had been in some doubt as to his status. He said, however, that much of his traffic was diverted. He did not recall any orders that had had any important effect, although he said that on instructions from Washington he had postponed any action on requests of employees for increased wages until after the general wage advance order had been issued and he found his road was not included. Then he had to advance wages out of the company's funds. He also remembered having received a long telegram which was delivered at his house about midnight, giving instructions as to how to comply with the daylight saving law. He had also been ordered to advance money out of the slender cash resources to help the employees buy Liberty Bonds which they expected to pay for out of a retroactive wage increase, and he had advanced his rates in accordance with General Order No. 28.

The Railroad Administration was represented by R. V. Fletcher, general solicitor, who had no witnesses ready and asked for a continuance of the hearing in order that he might present witnesses after he had learned the character of the testimony presented by the railroad. After some discussion the hearing was adjourned until Saturday, May 17. Mr. Fletcher had spoken of getting R. H. Aishton, regional director for the Western region during the time the road was receiving orders from the Railroad Administration, to testify, and Commissioner McChord had suggested that General Counsel Payne would make a good witness, but on Saturday Mr. Fletcher appeared again without witnesses, saying he had been unable to get Mr. Aishton. On cross-examination Mr. Fletcher attempted to show that the Arkansas & Louisiana Midland had failed to observe promptly some of the accounting instructions, such as those about opening a set of separate books for federal accounts. Mr. Ford said he could not claim to have followed all of the instructions because of insufficient clerical help and because many orders did not reach him till long after their effective dates; also he had frequently received a cancellation or modification of an order before he received the original order; but he made the point that many of the big roads had not been able to comply with the order to open separate books until months after the required date. The hearing was adjourned for half an hour while Mr. Fletcher went to find a witness on this point but the assistant director of accounting had just

received a telegram summoning him to St. Louis to meet the director general and so he could not appear. By this time the commission showed some signs of impatience and it allowed the usual procedure to be varied sufficiently to allow counsel for both sides to explain in their oral argument some of the evidence that would have been testified to if witnesses had been present or if documents had not been delayed.

The argument of John S. Burchmore, representing the Arkansas & Louisiana Midland, brought out some of the circumstances attending the relinquishment of the short line railroads last June. He read a memorandum from C. R. Gray, then director of operation, to General Counsel Payne, dated June 28, the day before the general relinquishment, giving a list of railroads, including the A. & L. M., which he said required considerate treatment because they were in competition with larger roads and which he recommended the relinquishment of in order to give an opportunity to negotiate with them "on a fair basis," but he said it would probably be necessary to take them back later. This memo was headed "Retention or Relinquishment," which Mr. Burchmore thought was rather conclusive evidence that the roads were at the time under federal control. He also quoted from one of the form letters of relinquishment sent out by Mr. Payne, saying that while there was some doubt as to whether they had ever been under federal control they would be formally relinquished to remove any doubt.

Mr. Burchmore said that a federal manager had never been appointed for the A. & L. M. but that federal managers for the larger roads in its territory had not been appointed until after the date it was relinquished. Mr. McAdoo had issued an order appointing the corporate officers as his agents and this had been received and acted on by the president of the A. & L. M. just as he had received and acted on the other orders sent to him as to the other roads. After the relinquishment Mr. Payne had written to Mr. Ford saying that if his company felt damaged by not being under federal control he would be glad to discuss the terms of a contract for taking it back. Mr. Ford, however, had refused to sign one of the co-operative short line contracts, which do not provide for compensation.

Mr. Fletcher argued that as the road had not been under federal control its remedy lies in a suit in the Court of Claims rather than in the appointment of a board of referees, but said that if the commission should find otherwise he would join in the request for the appointment of a board. Mr. Burchmore said the act provides that "any claim" for just compensation not adjusted by the Railroad Administration must be referred to a board and that until that is done he could not apply to the court without waiving his claim that the road was under federal control.

At this point Commissioner Daniels raised the practical question as to what a board could do if the commission cannot pay its expenses and the Railroad Administration will not. The act provides that members of the Interstate Commerce Commission organization shall serve on such boards without additional compensation, but this does not provide for the reporters' fees for taking the record. Mr. Fletcher said he had not been advised of the Railroad Administration's attitude on this point. Then followed a general discussion as to who should decide whether the road had been under federal control. It was apparently agreed that the commission had no function except to appoint the referees, but that the boards would have no jurisdiction to decide anything but the amount of compensation. Mr. Fletcher thought time and litigation might be saved if the whole thing were put up to the Court of Claims but Mr. Burchmore suggested that he would prefer to ask a District of Columbia court to mandamus the commission to appoint the board.

The hearing was closed with an understanding that Mr. Fletcher would file a memorandum on the functions of the Court of Claims.

385,000 Surplus Freight Cars

The net surplus of freight cars on May 1 was 385,447, including nearly 20,000 on Canadian roads, according to reports compiled by the Car Service Section. This represents a larger number of idle cars than has been recorded at any time since April, 1908, except on March 1 and April 1 of this year. On March 1 the net surplus stood at 473,080 and on April 1 it was 446,685, so there was a reduction dur-

inability to finance the equipment, some on the statement that the cars or engines are not needed, and some are based on the types, although the Railroad Administration has allowed the roads to exchange one type for another where it can be done before the builders have progressed too far with the building or the ordering of materials to make the change.

The circulars sent out by the regional directors asking for information as to the number and types of locomotives that

SUMMARY OF CAR SURPLUSES AND SHORTAGES AS OF MAY 1, 1919.

SUMMARY OF CAR SURPLUSES AND SHORTAGES AS OF MAY 1, 1919.										Shortages.								
Regions.	Surpluses.									Shortages.								
	Box.	Flat.	Coal & Gond.	Refr.	Stock.	Coke.	Furn.	Misc.	Total.	Box.	Flat.	Coal & Gond.	Refr.	Stock.	Coke.	Furn.	Misc.	Total.
Eastern	9,632	562	36,429	644	357	3,478	7	1,484	52,593	241	67	0	21	2	0	0	0	331
Allegheny	407	35	45,694	84	537	1,771	0	922	49,450	84	10	0	0	0	0	0	0	94
Pocahontas	38	9	9,651	28	65	0	0	29	8,820	0	0	0	0	0	0	0	0	0
Southern	27,800	925	18,145	1,859	2,933	374	36	591	52,663	0	354	0	0	38	0	0	0	392
Northwestern	31,032	3,400	13,880	3,372	7,707	0	47	1,316	60,754	25	0	0	0	0	0	1	0	26
Central Western	44,537	1,988	20,345	3,582	8,613	303	575	158	80,101	543	0	720	0	0	0	0	0	1,263
Southwestern	40,293	3,479	8,243	1,352	5,538	220	595	2,565	62,285	0	0	0	0	0	0	0	0	0
Total	153,739	10,398	152,387	10,921	25,750	6,146	1,260	7,065	367,666	893	431	720	21	40	0	1	0	2,106
Canadian Roads ...	15,098	1,285	2,200	599	808	0	0	0	19,990	3	0	0	0	0	0	0	100	103
Grand Total ...	168,837	11,683	154,587	11,520	26,558	6,146	1,260	7,065	387,656	896	431	720	21	40	0	1	100	2,209

*Principally automobile cars.

ing April of 61,000. As shown by the following table, there were more idle box cars than any other class, including a large number stored in the western regions in readiness for handling the grain traffic but there was also a large proportion of surplus coal cars, due to the slack conditions in the coal trade.

Train Control Committee

The Committee on Automatic Train Control returned last week from its western trip after having inspected automatic stop installations at Spokane, Wash., and San Francisco and Oroville, Cal. The members of the committee were able to hold almost a continuous meeting in their car and made much progress in their study of the various plans and reports of service conditions that are before them for consideration. The next meeting of the committee will be held in New York on June 3, at which time the members will inspect automatic stops in the Interborough Subway, on the Brooklyn Rapid Transit system and in the tunnels of the Hudson & Manhattan and the Pennsylvania terminal. An inspector representing the committee has been observing and making reports for several weeks on the operation of the Miller train control system on the Chicago & Eastern Illinois, and an inspector will probably be sent to report on the installation of the American train control system on the Chesapeake & Ohio. The committee will on later trips examine 15 or 20 installations, models or laboratory sets in the East, and will hardly be in a position to make recommendations to the Railroad Administration before fall.

Single Equipment Trust Proposed

Plans for the creation of an equipment trust to finance the 100,000 freight cars and 1,930 locomotives ordered by the Railroad Administration by a single issue of equipment trust obligations amounting to approximately \$400,000,000, instead of having individual securities issued by each of the roads, are under consideration by the Association of Railway Executives and the Railroad Administration.

Of the 100,000 freight cars ordered, 44,542 had been built up to April 30 and 92,750 had been assigned to various companies, but only 25,570 had been accepted, while 18,972 were in storage at the car-building plants. Of the 1,930 locomotives ordered, all but 41 had been assigned, but all the assignments had not been accepted. The locomotives have been accepted as fast as they have been built, but various companies have objected to the assignments just as they have to the cars. Some of the objections are based on the

will be required and whether the corporations will be willing to purchase locomotives of their own standards represent an effort to place some of the unaccepted locomotives, but it will not be possible to substitute individual or "made-to-order" designs for the standard types in many instances because the work on the parts for the standard types has been so far advanced.

Contracts Executed

The Railroad Administration has executed compensation contracts as follows: Central Vermont, \$835,000; Lehigh & New England, \$1,135,760; and Atlantic & Western, \$12,660; also co-operative short line contracts with the Kalamazoo, Lake Shore & Chicago; Erie & Michigan Railway & Navigation Company, and the Bowdon Railway.

The Railroad Administration has signed co-operative short line contracts with the Pecos Valley Southern, Chesapeake & Western, Akron, Canton & Youngstown, Arcade & Attica, Marion & Eastern and the Preston Railroad.

Conference on Equipment Allocation

The special committee appointed by the Association of Railway Executives to confer with the Railroad Administration regarding the allocation of the standard freight cars to the various companies has been in Washington this week and has discussed the matter with Director Shirley of the Division of Finance.

Demurrage Up to Director General

The question of reduction in demurrage rates which has been persistently demanded by the shippers is now before Director General Hines for decision on recommendations which have been made to him by the divisions of traffic and of operation.

The American Society of Civil Engineers will hold its forty-ninth annual convention at St. Paul and Minneapolis, June 17, 18, 19 and 20, with headquarters at the Radisson Hotel, Minneapolis. Tuesday, the 17th, will be devoted to business sessions in the morning and afternoon with a reception in the evening. Wednesday will be devoted to sightseeing trips by automobile about the city. On Thursday a trip will be made by automobile to the plant of the Northern States Power Company at Taylors Falls, Minn. On Friday afternoon the party will go by special train to Duluth and on the following day will tour the iron mines on the Missabe range.

Orders of Regional Directors

PROCEEDINGS BEFORE I. C. C.—The regional director Eastern region, by circular 1500-116A726, sends to federal managers regulations and suggestions, prepared by the Director of the Division of Traffic and the general counsel, at Washington, for defending before the Interstate Commerce Commission complaints against the railroads made to that body. The traffic assistants to the regional directors are to supervise these matters, and they are to look after compliance, by the railroads, with the various orders of the commission.

Superheaters.—The Eastern regional director, by circular 500-1-97A728, authorizes the application of superheaters to locomotives where all of the needed material is already on hand. The corporations must be consulted, but if material is on hand such consultation need not cause delay.

The Pocket List.—The Eastern regional director, by circular 1500-1-3-19A729, advises federal managers of a suggestion from the director general that in giving information to the Pocket List of Railroad Officials, or in correcting data in that periodical, care be taken to furnish full and correct post office addresses.

Maintenance Budget.—The regional director, Eastern region, by circular 2700A733, instructs federal managers as to detail requirements connected with preparation of maintenance budgets for 1919.

New Tracks for Industries.—The Eastern regional director, by circular 2700A734, advises federal managers that important propositions for industrial sidings should be dealt with by wire. The regional director should be informed how long a time will be needed to lay the track, and how soon it will begin to furnish revenue. This for the purpose of determining whether the improvement will produce profit during the present year. In connection with larger projects, requiring a longer time, the railroad corporation should be consulted.

Intoxicated Soldiers.—The Eastern regional director, by circular 2900-66A735, calls attention to complaints of the presence of intoxicated soldiers and sailors on railroad trains. Federal managers should see that trainmen and other employees enforce proper conduct, and especially in territory where drinking intoxicating liquors on trains by civilians is a violation of local laws.

Operating Statistics.—The regional director, Eastern region, by circular 1801-22A736, gives further instructions as to preparing, for the operating statistics section, data concerning worktrain cars moving in revenue trains.

Tinners' Convention.—The regional director, Eastern region, by circular 102-36A738, and the Northwestern director, by circular 77-1-93, announce approval of the convention which is to be held by the American Railroad Master Tinners', Coppermiths', and Pipefitters' Association in June. Federal managers exercise their own judgment as to granting leave of absence and giving passes.

Heavy Loading.—A. H. Smith, regional director, Eastern region, by circular 500-13-1A741, sends to federal managers a letter from the director of the Division of Traffic, calling for continued efforts to have freight cars loaded to capacity. To increase minimum weights in tariffs would be a slow and difficult process, but it is believed that traffic representatives can continue to do good work with shippers and receivers. Shippers should be shown the economy of full loading and be reminded that voluntary action on their part will tend to stave off the day when arbitrary rules will have to be adopted. Where orders from consignees are alleged to be the cause for light loading, those consignees should be seen.

Tracers and Passing Reports.—A. H. Smith, regional director, Eastern region, by circular 600-1-6-A742, calls on federal managers for information as to their practice, and

their recommendations, in regard to giving shippers fuller information concerning the progress of shipments. At the recent conference in Washington with the National Industrial Traffic League, shippers asked for passing reports of I. C. I. freight at transfer stations and for permission to ask information directly from local agents. Mr. Smith finds that present practice is not uniform; he desires advice as to improvement in practice and as to the probable cost of keeping the proposed records at transfer points, and of establishing a manifest system for keeping track of carload shipments.

Transportation of Liquor for Diplomats.—The regional director, Eastern region, by circular 600-174A743, calls attention to the legal aspects of the transportation of intoxicating liquors from a foreign country consigned to a diplomatic representative residing in the District of Columbia. The seller of liquor and the carrier are ordinarily liable to the penalty of the Reed law; but liquor sent from abroad to diplomatic representatives of foreign governments in this country may be transported by freight or express to its destination.

Operating Statistics.—The Eastern regional director, by circular 1801-22A744, promulgates additional instructions concerning revised statements of expenses after making adjustment for back pay, and for reporting locomotive and train costs on form OS6 and form OS7. By circular 1801-22A747 he calls for monthly statements of freight and passenger revenue, to be made on form OS8; this is the same information which is required annually by the Interstate Commerce Commission.

Blacksmiths' Convention.—The regional director, Eastern region, by circular 102-37A745, approves the annual convention of the International Master Blacksmiths' Association, to be held at Chicago, August 19, 20 and 21. Each road will follow its usual practice in regard to allowing blacksmiths to attend.

Diversion of Freight—Notice to Consignees.—The Eastern regional director, by circular 600-43-4A746, prescribes a form by which notice is to be mailed to consignees when a carload of freight is diverted in transit.

Record of Work at Enginehouses.—The Eastern regional director, by circular 1801-127A748, sends to federal managers revised instructions for reporting, monthly, the number of man hours worked at enginehouses. This report goes to Frank McManamy, Washington.

Annual Passes for Employees.—The Eastern regional director, by circular 2100-9A750, advises federal managers that where an employee requires an annual pass over other than his home road, that pass should include also his transportation over the home road, so that he will carry only one pass for all.

Preparations for Wheat Crops.—The Southwestern regional director, in circular 210, quotes an article which appeared in a weekly news letter issued by the United States Department of Agriculture concerning the possibility of the coming wheat crop congesting storage facilities and suggests that at interior points a canvass be made of the situation. The construction by farmers and shippers of additional storage facilities should be encouraged.

Consignments to Shipper's Order.—The Northwestern region, file 88-1-75, states that the provisions of circular, file 88-1-75, issued by the Northwestern regional director (*Railway Age*, February 7, page 349), apply only to shipments destined to points in Western Classification territory, Northwestern, Central Western, and Southwestern regions.

Report on Reclamation of Materials.—The Northwestern Regional Purchasing Committee, in supplement 7 to circular 10, gives a list of items of material being reclaimed by various roads in this region. The list is long and detailed, containing about 800 items.

Distinguished Service Medal for George Hodges

Record of His Work as Manager of Railroad Troop Movements Throughout the War

ANNOUNCEMENT was made on May 16 by Walker D. Hines, director general of railroads, that the distinguished service medal has been posthumously awarded to George Hodges, late manager of the Troop Movement Section of the Division of Operation of the Railroad Administration, who had organized and had charge of the troop movement work from the start.

The information was contained in a letter from Newton D. Baker, secretary of war, to the director general, under date of May 13, as follows:

"It is with sincere regret that I learn of the death of Mr. George Hodges, manager of the Troop Movement Section of the Division of Operation of the United States Railroad Administration.

"The services of the railroads during the great war are gratefully remembered, and I thank you for the suggestion that some suitable recognition of the work of the man who was largely responsible for their success might be made by the War Department. I take pleasure in advising you that, by direction of the President, and under the provisions of the act of Congress of July 9, 1917, the Distinguished Service Medal has been posthumously awarded to Mr. George Hodges 'for especially meritorious and conspicuous service as manager of the Troop Movement Section of the Division of Operation of the United States Railroad Administration. Mr. Hodges arranged all the details of the movement of troops from local draft boards to mobilization camps, between camps, or from mobilization camps to the ports of embarkation for shipment overseas. Troops in large numbers were moved on short notice and he was responsible for the successful co-ordination and carrying out of these movements.'"

At the beginning of the trouble with Mexico he was placed in charge of the American Railway Association special committee for co-operation with the military authorities. With the declaration of war against Germany in April, 1917, he was appointed assistant to the chairman of the Railroads' War Board. After the taking over of the railroads by the government, the organization under Mr. Hodges was made part of the United States Railroad Administration. On May 24, of the same year, he was put in charge of the Troop Movement Section of the Division of Operation.

He died very suddenly in Washington on March 14.

A brief account of the work of the Troop Movement Section was published in connection with the report of the Division of Operation in the *Railway Age* of January 10, which gave figures showing the extent of the troop movement from May 17 to November 10, the day before the signing of the armistice. C. F. Stewart, Mr. Hodges' successor as manager of the Troop Movement Section, has issued a circular containing a copy of Secretary Baker's letter, saying, "This splendid tribute to Mr. Hodges will be appreciated by all those who have so ably assisted the movement of the troops and through whose co-operation such a success was made possible." The circular also encloses a copy of the record to November 11, which was prepared by Mr. Hodges, and also a supplemental report showing the movement from November 11, 1918, to April 30, 1919, during which time there have been moved a total of 3,389,665 men, of which 1,583,942 were moved on regular trains and 1,805,723 on special troop trains. This is an average of 635,959 per month.

From May, 1917, to April 30, 1919, the Troop Movement Section has been responsible for the movement of a total of

over 14,000,000 men, nearly half of whom have been moved on special trains. The maximum for any month of the entire period was 1,147,000 in July, 1918. This entire movement has been accomplished with only 16 accidents involving death or injury. The number of men killed was 39 and the number of men injured 335. The table gives the consolidated statistics regarding the movement from May, 1917, to April 30 of this year:

TROOP MOVEMENTS MAY, 1917, TO APRIL 30, 1919

1. Troops Moved:		
(a) Drafted men from their homes.....	2,287,926	
(b) On regular trains.....	5,252,432	
(c) On special troop trains.....	6,851,915	
Total		14,392,273
(d) Average per month.....	504,343	
(e) Maximum July, 1918.....	1,147,013	
2. Cars Furnished:		
(a) Pullman, standard and tourist.....	90,773	
(b) Coaches for special troop trains.....	87,984	
Estimated coaches for draft and regular train movements	69,802	248,559
(c) Baggage and express cars for special troop trains	16,084	
Estimated baggage and express cars for drafted men	4,576	
(d) Freight cars for special troop trains.....		20,660
Total		293,248
3. Special Troop Trains:		
(a) Number run	16,393	
Estimated number required for drafted men	4,576	20,969
4. Average Special Troop Trains:		
(a) Number cars per train.....	12	
(b) Distance per train.....	803	
(c) Number hours per train.....	40	
(d) Miles per hour.....	22	
(e) Men per train.....	418	
5. Accommodations:		
(a) Number carried in Pullman cars.....	3,440,173	
(b) Number in coaches.....	8,664,074	
(c) Percentage in Pullman cars.....		28.4

The following description of the work of the section outlining briefly its organization and methods was prepared by Mr. Hodges:

When diplomatic relations with Germany were severed, steps were at once taken to put together the machinery to handle troop movements upon a large scale, based upon the experience gained in the movement of troops to the Mexican border in 1916.

At the declaration of war on April 6, 1917, the skeleton of the organization was complete, and it only remained to supplement it as occasion arose for its development.

This skeleton consisted of a central office in Washington in constant communication with the War Department, a general agent with his staff at the four (afterward six) department headquarters, and a general agent in each state to superintend the railroad movement of the National Guard.

As necessity presented itself there were added successively a general agent at the headquarters of the construction division of the quartermaster corps, general agents at the increment camps and in charge of the railroad end of the construction of the cantonments and the National Guard camps (who remained in charge after the troops had occupied them), as well as others at embarkation camps and at ports.

The duties of these general agents have been to keep in touch with the officers to whom each was accredited, to ascertain what was desired to be done and to arrange through the appropriate channel in each case to do it; to see that trains and cars were provided at the time required; that the loading was done properly, and, in general, to translate into terms of action the necessities of the army.

There have been in service 127 of these; the closing of

some camps and the movement of the National Guard from their respective states have relieved a number from duty, and there remain 64.

It became early evident that to move successfully such large numbers of men would entail unprecedented use of telegraph wires, and that the brief cipher used in 1916 would not answer the purpose. To meet the necessity for secrecy and brevity, a cipher expert, J. Edwin Dempsey, was called in to devise an efficient code. This he did; the code work being his personal contribution; the railroads paying the necessarily heavy expense of publication. This code was also adopted by the quartermaster general for use in his department. It was later supplemented by a route code book, by which all routes were coded into one cipher word regardless of how many roads or junction points were included.

The movement of troops with their impedimenta and of selective draft men and recruits may be generally divided as follows: (1) The movement of the regular army to its increment camps. (2) The movement of the National Guard to its camps. (3) The movement of the National Army from their homes to their cantonments. (4) The movement of men from one camp to another to meet the needs of the service.

In addition to these there has been a constant stream of recruits moving from depots to camps and continuous movements of bodies of organized troops to camps or ports.

The movement of the regular army to increment camps was performed with great ease by reason of the relatively small number of men involved and their experience in travel.

Before speaking of further movements it should be noted that on June 1, 1917, none of the camps to which the National Guard or National Army were destined were more than just begun, and in some cases the locations had not been fixed.

The problem of bringing the material to these 32 large camps, as well as to the 15 or 18 aviation schools also under construction, that the work might proceed at top speed, was satisfactorily solved by successful co-operation between our Washington organization and the force of the construction quartermaster, General Littell, the liaison officer being C. E. Denney, general agent of this association, who was attached to General Littell's staff.

Altogether this construction work involved bringing to the various sites 139,905 cars of materials. This was accomplished by ordinary means and practically without setting up any priorities in movement. Although an extraordinarily large commercial and allied tonnage was also moving, it was before any large volume of government tonnage was under way with the confusion and congestion caused by the indiscriminate forwarding of such freight without regard to physical limitations or to the necessity for its orderly transportation and prompt release at destination.

The movement of the National Guard involved about 343,223 men. The guards of the several states were not as in 1916 mobilized in one place, but in many instances were picked up company by company at home stations, necessitating elaborate schedules to bring a regiment together before despatching it upon its long journey to the Southern camps. The entire movement was, however, made upon the schedule as outlined by the War Department. At our suggestion, it was twice suspended pending the movement of increments of the National Army.

The movement of the National Army was a most complicated one. Originating at upwards of 4,500 points in every county of every state, the men had to be brought within a given period of time to their cantonments. To do this involved scheduling every movement of every train, regular or special, on which any of these men traveled, placing these schedules in the hands not only of the railroads concerned but also in the possession of every one of the local exemption boards at points of origin. That it was done on schedule and without disorder or accident is noteworthy.

All our suggestions as to dates were accepted by the War Department; when these dates were set, all details were turned over to us. The schedules were prepared by the several passenger associations, and a competent representative was placed by the association in the office of the governor or adjutant general of each state during the movement to adjust any difficulties that might present themselves. We also were obliged to undertake the feeding of these men. This was done in some cases by using dining cars, in others in eating houses, and in others by supplying lunches on the trains.

Almost immediately upon the arrival of the National Army at its camps there began an inter-camp movement of large proportions. During a portion of this time, organizations of the National Guard were moving South. It was therefore frequently necessary to make suggestions as to appropriate dates for such movements to avoid overcrowding of roads and gateways. These suggestions were cordially accepted.

A review of the troop movements would not be complete without a reference to the extremely heavy demands made upon the railroads by the furloughs granted at the divisional camps. In many instances thousands have been furloughed for Saturdays or Sundays, and at Thanksgiving and at Christmas the number of men on leave was well above 100,000 in each case. The requirement in power to meet this has been serious in its effect.

The organization in Washington as it has been built up consists of:

A routing section under C. F. Stewart, which arranges the routes by which the troops travel subject to the approval of the quartermaster general. This section represents the passenger department of the railroads. It has an employee in the office of the quartermaster general.

A transportation section under J. W. Smith, which controls the arrangements for actual movement over the railroads involved, and keeps in touch with all necessary features of transportation.

A pullman section under C. W. Henry, placed with us by the Pullman Company, which apportions the available tourist cars under authorization for their use from the quartermaster general.

To these was added a liaison officer, Major R. E. Shannon, U. S. R. A., who acts as a point of contact with the War Department to acquaint us with its desires and it with our needs and preferences.

The concentration of these several functions in one place has reduced lost motion to a minimum and has secured the maximum of information being available at all times. As a result all the difficulties inherent in any scheme of co-operation have been removed as they appeared and a smoothly running machine is in operation which has been able to take care of any situation which has presented itself. It is sufficiently flexible to enable us to make the greatest possible use of the facilities of parallel lines in order to avoid overburdening any; to throw troops around congested areas, or, in fact, as it is now organized and related to the War Department, it is possible for us to so handle the movements as may best serve the physical necessities of the moment, except, of course, where an actual military necessity must govern.

This service has been made possible only by the cordial co-operation of officers of the army, and particularly those of the general staff, the adjutant general's office, the provost marshal general's office and of the quartermaster's corps.

Street railway conditions in cities where approval of rate advances has been refused or deferred, are to be investigated soon by a new government commission. President Wilson has cabled his sanction for creation of the commission. Fifty or more street railways are already in receivers' hands and many others are threatened with a similar situation.

Railway Developments in Foreign Countries

Officer of Southern Mexican Roads on Visit to United States; Export Figures for March

COLONEL PAULINO FONTES, general manager of the southern railways of Mexico under government control, is at present visiting the United States to arrange for the purchase of a larger volume of railway supplies. After visiting St. Louis and Chicago, he will arrive in New York on May 28. Colonel Fontes, who is a native of the state of Sonora, entered the railroad service in 1899 as a brakeman on the Southern Pacific Railway, lines south of Nogales, Sonora. He was promoted in a few years to freight conductor, and then was given a passenger run. In 1910 he left the Southern Pacific to join the revolution against the Diaz Government, and was given charge of all the military trains during the pre-Constitutional Administration of President Carranza. Then he became general superintendent of the Constitutionalist Railways, and later was appointed general manager of all the lines south of Mexico City, which position he now holds. Colonel Fontes is a graduate of the University of California and speaks English fluently. He is regarded in Mexico as one of the ablest men in government railway circles.



Col. P. Fontes

Belgian Inland Waterways Commission

A Belgian Waterways Commission has been established, the functions of which will be to prepare a program for the exploitation and organization of navigable waterways. The commission will work under the Ministry of Railways, Marine, Posts and Telegraphs, and will complete the work of the Inter-Allied Waterways Commission.

German Cars Turned Over to the Allies

No statistics are as yet available giving the exact amount of German railway stock handed over under the armistice conditions, says the Railway Gazette (London), in its issue of April 25, but it may be said that the amount of restitution to date is on a far larger and more satisfactory scale than the average newspaper reader might imagine. This is particularly noticeable in regard to freight cars. At practically every station and siding of importance throughout Belgium and northern France one sees today strings of German freight cars, which in fact seem to outnumber the native cars, and a very large percentage of the merchandise traffic now being handled is moved in enemy equipment. German locomotives are not so conspicuous, but they are also to be seen to a noticeable extent, and their external appearance is on the whole no worse than that of the average French and Belgian locomotive today. Passenger cars of all kinds have also been delivered in large numbers, ranging from the oldest type of third-class coach to the most modern corridor car de luxe. The German corridor equipment is being operated on the fast express services, and it was on a train largely made up

of these former enemy vehicles that Lloyd George recently travelled from Boulogne to Paris. The corridor cars are in remarkably good condition.

Railway Construction in Mexico

According to the announcement of the Department of Communications and Public Works of the Mexican government, the Cananea Copper company and other American interests have filed application for a concession to construct a railroad from Cananea to Bahia Roca, a prospective deep-water port on the Gulf of California. The route of the prospective line is through a part of the state of Sonora that is rich in undeveloped mineral resources. The distance between Cananea and Bahia Roca is about 175 miles. At present the only railroad reaching Cananea is the one which runs down from the Arizona border. By obtaining connection with the deep-water port it will be possible for the big mining camp to receive supplies at lower cost, it is claimed. It will also afford means for shipping the smelter products by water.

Finland's Arctic Railway

The realization of the projected railway from Rovaniemi, on the Arctic Circle, north of the Gulf of Bothnia, to Petschenga, Finland's road to the Arctic Ocean, has been left in abeyance for some time, but is now to be proceeded with. The scheme originally emanated from the Russian Government, which urged or ordered Finland to construct a railway along the Pasvik to Petschenga, or in any case to make the necessary preparations. The North Railway went only as far as Rovaniemi, whence there remains a distance of about 300 miles to Petschenga, 120 miles as far as Kyrö, and 180 miles on to Petschenga. The preliminary road, which was to precede the railway, has been almost completed from Rovaniemi, past Sodankylä to Kyrö. It has a breadth of about 35 ft. half of which is intended for the future railway. The section from Nautsjoki to Tollei and Petschenga is built in an unsatisfactory manner, and the revolution stopped progress, at least as far as this Russian section is concerned. Finland, however, proceeded with the work, after the country's occupation by German troops, under the management of German officers, and a light railway was constructed as far as Kyrö. The part played by the Germans in Finland then came to an end, but there is now a possibility that England will step in and help Finland to complete this important railway, which has possibilities from the industrial and commercial point of view. In this connection reference should be made to the contemplated Norwegian free port in East Finmark. Opinions have been divided as to where this port should be located, but advantages are claimed for Kirkenaes, both for sea and land traffic, and as regards timber and iron ore.

Europe to Build Own Railroad Equipment

American car builders are not basing their estimates of future business on prospects of big orders from either France or Great Britain, according to the opinion of W. H. Woodin, president of the American Car & Foundry Company as expressed to a representative of the New York Tribune.

"France, England and even Germany," said Mr. Woodin, "will probably be in a position before long where they will be able to supply their own needs in the railroad equipment

line. England, if necessary, can turn over to Canadian manufacturers for additional supplies.

"There should be an excellent market, however, for American-built cars in other parts of the world, particularly in South America, where the railroads are in need of equipment, but large orders are dependent on the ability of these countries to finance their purchases in this market. In my opinion the way this should be done is to offer the securities of the South American railroads direct to American investors. This method is better than to have the securities offered indirectly through some buffer corporation or syndicate which would demand a substantial profit for its work."

The American Car & Foundry Company has not taken any recent orders for foreign delivery, Mr. Woodin said. Substantial progress is being made on orders for freight cars placed with the company by the Italian government and India shortly after the signing of the armistice. A total of 13,250 cars is involved, of which 10,000 are to go to Italy and 3,250 to India. These contracts are valued at about \$25,000,000.

Exports of Railway Track Material in March

Exports of railway track material in March totaling \$193,987 for spikes, \$3,051,611 for rails and \$515,535 for switches, frogs, etc., were not as great as in January or February. Of the 48,955 tons of rails in March (comparing with 65,024 tons in January and 66,900 tons in February), 18,131 tons were destined for France and 6,060 tons for Japan. The figures, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, follow:

Countries	Railroad spikes		Rails of steel		Switches, frogs, splice bars, etc.
	Pounds		Tons		
Belgium			6,354	\$353,712	\$18,806
France	1,934,500	\$78,678	18,131	1,074,519	209,190
Italy			2,258	201,400	44,030
Norway			215	10,500	
Canada	383,800	11,570	2,773	109,658	17,649
Costa Rica					99
Guatemala	10,000	560			
Honduras			1,386	78,572	7,390
Nicaragua					96
Panama					2,713
Salvador	875	58			10
Mexico	79,576	5,314	443	25,229	23,973
Barbados	11,600	551	140	9,514	2,313
Jamaica			4	300	
Other Br. W. Indies (except Trinidad and Tobago)	8,510	478	30	2,218	674
Cuba	368,606	18,292	2,314	149,047	66,901
Dominican Republic	9,000	514	54	3,022	2,158
Argentina	30,030	3,303			
Brazil	338,100	15,549			7,193
Chile	71,980	4,319	2,249	115,811	15,831
Colombia	11,700	739	447	31,561	3,053
Ecuador					295
Peru	16,200	805	595	39,955	4,742
China			1,584	113,688	2,884
Chosen	6,720	420			
British India			12	2,700	819
Straits Settlements	19,800	1,386			
Dutch East Indies	130,324	6,019	2,266	164,387	20,605
Japan	319,103	16,504	6,060	464,755	43,468
Russia in Asia	108,192	3,494	655	30,944	5,003
Siam	242,000	20,084	50	4,032	145
Australia					7,697
Philippine Islands	84,000	5,264	54	4,200	7,319
British West Africa	1,200	86			
British South Africa			881	61,887	1,479
Total	4,185,816	\$193,987	48,955	\$3,051,611	\$515,535

Exports of Locomotives in March

The exports of locomotives in March totaled only 27 with a value of \$852,224 as compared with 87 in January valued at \$3,076,543 and 85 in February valued at \$2,584,269. Of the March exports over half from the standpoint of value, namely 12 locomotives valued at \$681,204 were exported to Chosen. The figures in detail as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

Countries	Number	
Canada	5	\$18,000
Mexico	2	21,495
Cuba	3	52,125

Peru	2	39,700
Chosen	12	681,204
Straits Settlements	1	31,200
Dutch East Indies	1	5,500
Philippine Islands	1	3,000
Total	27	\$852,224

Exports of Car Wheels and Axles in March

Exports of car wheels and axles in March totaled \$686,281, a considerable increase over the total of \$278,393 in January and of \$541,630 in February. Shipments to Japan totaling \$255,308 made up the largest item in the whole while Japanese China was second with \$93,410. The figures in detail as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce follow:

Countries	
France	\$31,387
Iceland and Faroe Islands	653
Italy	61,468
Norway	178
Canada	77,668
Costa Rica	2,490
Guatemala	111
Panama	779
Mexico	11,907
Jamaica	2,188
Other British West Indies (exc Bermuda, Trinidad and Tobago)	268
Cuba	12,355
Dominican Republic	850
Argentina	11,331
Brazil	12,792
Chile	390
Colombia	1,755
Ecuador	2,198
China	10,758
Japanese China	93,410
Chosen	6,200
Dutch East Indies	63,236
Japan	255,308
Australia	25,096
British West Africa	500
British South Africa	1,005
Total	\$686,281

Orders Placed in U. S. Alarm British

Recent announcement of big orders placed in the United States when British factories were anxious for work has caused the nation some alarm, according to a communication to the Journal of Commerce, New York, from Liverpool, under date of May 1. With unemployment growing, the English manufacturers admit that they are suffering from competition with the Americans and point to the instance where an order for steel rails was placed by a Birmingham corporation in the United States. Fear is expressed that a \$1,775,000 contract for locomotives has been lost to a United States firm, and discontent is growing as to the policies of reconstruction.

Reviewing the situation the Liverpool Journal deals with what it terms "unpleasant realities":

"The placing of an order for steel rails in the United States by the Birmingham Corporation is only one and perhaps the least striking instance of the kind. France also requires rails and recently offered contracts to English and American manufacturers for 750,000 tons of them. When the English manufacturers got down to absolute bare net cost, with no profit at all, they were still 30s per ton outside the price quoted by the American manufacturers. Orders for the first 500,000 tons have already gone to the United States. The remaining 250,000 tons were held over for English manufacturers, but the latter could make no certain promise of delivery owing to threats of strikes, and if they have not already gone they are likely to follow the first 500,000 tons to the United States. An order for about £375,000 (about \$1,875,000) for locomotives was offered to the North British Locomotive Company. This is believed also to have been lost to the United States. It is a matter of common knowledge in the iron and steel and engineering industries that reconstruction orders for France and Belgium are going to the United States far more than they are coming to this country, although British manufacturers want the work.

"It may be asked why this state of affairs should exist, and we believe the explanation will be found in the statement of A. J. Robson of Sheffield, the chairman of several of the largest steel-making concerns in the North of England, that 'without a larger and cheaper production, home and export trade will be crippled.' If we are to preserve for the nation 'the position and influence and authority which they have gained by their sacrifices and efforts in the cause of human liberty and progress, and to bring into being such conditions of living for the inhabitants of the British Isles as will secure plenty and opportunity to all,' no further time must be lost in applying these economic principles which have enabled us during the past four and a half years to maintain production at the high level demanded by the circumstances and to insure security for the workers."

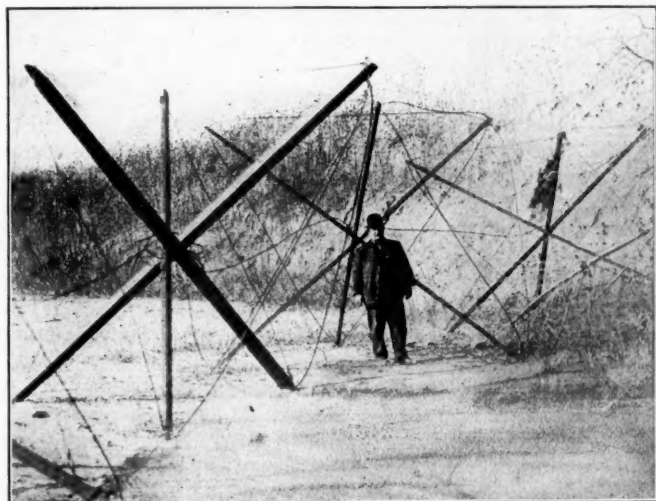
A New Form of River Bank Protection

By F. T. Morse

Office Engineer, Atchison, Topeka & Santa Fe, Topeka, Kansas

THERE ARE VARIOUS MEANS for fighting a river that is cutting its banks and many thousands of dollars have been spent by the railroads in protecting their properties from encroachment through various methods of protection, all of which involve the expenditure of considerable sums of money. For this reason attention is directed to a form of protection recently developed and put into service locally along the Kansas or "Kaw" river in the vicinity of Topeka, Kans.

This is a jetty which consists of one or more units, prefer-



One of the Steel Jetties Just After Placing

ably at least four, and each unit consists of three structural steel angles, 16 ft. long, properly fastened together in the centre in the form of a jack stone, such as children use in playing jacks. The extreme ends of these three angles are fastened one to another with half-inch wire cable. Various sizes of angles have been used. The four or more units are fastened one to another by wire cable, attached to the centre of each unit, and this cable is fastened to a dead man some distance from the bank. The material is shipped in a knocked-down condition to the point of use. There each unit is assembled on the bank, the several units are properly tied together with one end anchored to the shore, and the whole jetty is rolled into place in the stream.

At first sight it appears that there is little in this affair to protect the bank, but its apparent efficiency would seem

to be due to the fact that the jetty decreases the velocity of the water passing through it sufficiently to deposit some of the sand being carried down stream by the swift current, and once a deposit is started it continues rapidly. Of course, brush catches in the prongs of the affair, but the jetty is not dependent upon this brush for results. In fact the builders claim better results where no brush interferes. Should brush lodge, and overturn the jetty, it is in the same position as before and unharmed.

The advantages of this jetty lie largely in its relatively cheap installation cost and to the short time required to place it, as compared with other means of bank protection. Experience with this construction indicates that the results are satisfactory. Then, too, the effect of this jetty in pushing



Deposit of Sediment Resulting from the Presence of Two Jetties

the river away from the point of cutting is only moderate, so that the current is not turned sharply away only to have it do even greater damage at some point further down stream.

The pictures show the form of construction and indicate possible results. One photo shows a jetty just after installation. The other picture shows clearly that a bar or deposit is forming below the point where two jetties had been placed. The river had given more or less trouble here, and considerable money had been spent in a small way without much success until this jetty was placed in the fall of 1918. The picture was taken just after the heavy rains, and high water of March, 1919. In all of 37 places where jetties of this kind have been installed the river has stopped cutting.

If the protection is required for some distance along the river, it is necessary to place the jetties at intervals of from two hundred to three hundred feet. These jetties were developed by J. W. Kellner, manager of the Steel Jetty Company, Silver Lake, Kans., and are covered by patents.

At Galveston, Tex., on May 5, representatives of various grain organizations, the United States Railway Administration and the Department of Agriculture began an investigation of the inspection, grading and handling of grain at terminal points, the object of the meeting being to look into demurrage rates and delays in unloading. Among those who took part were W. J. Niergarth, St. Louis; J. W. Shorthill, York, Neb.; R. S. Hurd, Wichita, Kan.; Elmer Hutchinson, Arlington, Ind.; C. W. Crawford and N. J. Manley, representing the United States Railway Administration, and R. T. Miles, of Chicago, representing the Bureau of Markets, United States Department of Agriculture.

Additional Objections to Proposed Rules for Competitive Bidding

IN ADDITION to the statement outlining suggestions and objections to the rules for competitive bidding proposed by the Interstate Commerce Commission under the Clayton law, which were filed with the commission by a special committee appointed by the American Railroad Association, as reported in last week's issue, separate statements have been filed on behalf of the Baltimore & Ohio and Union Pacific railroad companies. George M. Shriver, vice-president of the Baltimore & Ohio, in a letter, expressed the opinion that the proposed regulations should not become effective because they seek to frame a single provision which will apply both to ordinary contracts for construction and supplies and also to financial transactions, and the proposed regulations as applied to financial transactions are impracticable. Mr. Shriver said that in a tender for bonds, stocks or securities the time for acceptance must in practice be very short and notice of acceptance must in practice close the transaction immediately. The proposed regulations provide 10 days for acceptance and 10 for the bidder to accept the contract and this after disclosure of the price at which the bidder would be willing to buy and the seller would be willing to sell. The company submits that to meet the ordinary conditions of the market it is practically necessary in the sale of securities that there be a definite closing of the transaction on the day bids are opened.

H. W. Clark, counsel for the Union Pacific, submitted that the subject matters are so different in nature and incidents that similar treatment of them is impracticable. There is no need, he said, in the case of proposed sales of securities for the requirement that specifications, drawings and the form of contract be prepared and copy offered for examination. All necessary description of the securities can be embodied in advertising or a more complete description can be printed for free distribution. The provisions of the tentative regulations in respect to advertising, he said, are in every respect inappropriate to the case of the sale of securities; particularly a requirement of two weeks' advertising is intolerable. Bankers, he said, cannot take the risk of making a bid for securities to remain good for any substantial period. Forty-eight hours would probably be ample notice. The time within which the most favorable bid must be accepted must be much less than 10 days and a provision for allowing another 10 days for the accepted bidder to sign the contract is quite impracticable. It was earnestly submitted that in the case of offerings of securities the regulations should permit a somewhat limited invitation for bids as an alternative to the general offering to the public. It was appreciated that under the act no person can be prevented from making a bid who learned of the offering and desired to submit a bid, but to require that offering of securities shall be made upon public advertising, inviting the whole world to bid, Mr. Clark said, would put a premium on the making of irresponsible bids by small and irresponsible bankers gambling upon the chance of their being able to form a syndicate in the event of the acceptance of their bid.

G. S. Fernald, general counsel of the Pullman Company, submitted a letter joining in the statement filed for the railroad committee.

The letter filed by Director General Hines said in part: "The director general, disclaiming any intention to express an opinion as to the character of the regulations proposed to be adopted, respectfully gives the commission to understand that the director general is not affected by the proposed regulations, since the Clayton act and particularly Section 10 thereof, has no application to the director general nor to

railroads operated by him during the period of federal control. The language of the Clayton act, as well as of the provisions of the federal control act render this conclusion inescapable." For the information of the commission he presented a brief statement outlining the purchasing methods of the Railroad Administration, showing that purchases of cars, locomotives and rail are made by the central purchasing organization and that other purchases are made by the purchasing officers of the individual roads acting under the supervision of the regional purchasing committees, but that all purchases of materials and supplies are made by the federal railroad organization.

Activities of Engineering Council

INFORMATION concerning the activities of Engineering Council was given by J. Parke Channing, chairman of the conference held in Chicago a couple of weeks ago, and has been amplified by data from other sources. Engineering Council was created three years ago by the four national societies of civil, mechanical, electrical and mining engineers, to which has since been added the American Society for Testing Materials, to represent these societies and the engineering profession in matters of common interest.

Since its organization it has furnished the government with approximately 4,000 names of engineers for service in the war. It co-operated with the Naval Consulting Board and the Army General Staff in reviewing 135,000 suggestions and inventions for war devices. It organized an employment bureau ten days after the armistice was signed, which has filed 2,500 applications for employment since December 1, 1918, and has placed 500 engineers in positions. It has created a National Service Committee with a chairman permanently established in an office at Washington, giving his time to work at the national capitol to service for engineers in all parts of the country, including a bureau to supply information concerning congressional and departmental activities. It co-operated with the fuel administrator and the Bureau of Mines in their campaign on fuel conservation and with the United States Chamber of Commerce in presenting information concerning water power while bills were before Congress.

Engineering Council joined with other organizations in securing from the War Department the exemption of engineering students from military service until their training was sufficiently advanced to make them valuable in the various technical services of the Army and Navy. It appeared before the Board of Railway Wages and Working Conditions at Washington in an effort to secure better classification and compensation of engineers in railroad employment. It has organized a committee on classification and compensation of engineers. It also has committees studying the problems of Americanization, curricula of engineering schools, the international affiliation of engineers, the licensing of engineers, patents and public affairs.

Engineering Council has participated in conferences regarding the organization of all fighting units so as to have a definite proportion of engineers and construction foremen among the officers to direct the necessary construction at the front, and the organization and establishment of the student army training corps. It appeared before a Senate Committee on invitation to explain the possibilities of a National Department of Public Works. It participated in the organization of a National Board for Jurisdictional Award, and will appoint one of the eight members of that body. It conducted a conference in Chicago from April 23 to 25 to determine whether it should advocate a National Department of Public Works as a result of which it has since organized to promote such a department.

General News Department

A record movement of troop trains was made last month—April—when the railroads of the country handled 1,009 special trains occupied by 720,623 soldiers.

The Fuel Administration has issued an order abolishing all of its rules relating to business in crude oil, fuel oil, gas oil, kerosene, gasoline and natural gas.

The Maryland Bankers' Association, at its convention at Atlantic City, N. J., on May 21, unanimously endorsed the "Warfield Plan" for the return of railroads to their owners and for permanent legislation relating to railroad regulation.

The Order of Railway Telegraphers is holding its national convention at St. Louis, Mo. Delegates and friends attending this convention numbered about 1,200. Walker D. Hines, director general of railroads, addressed the convention on Monday of this week.

The Tennessee Bankers' Association, the junior United States senator from New Jersey (former Governor Walter E. Edge), and the Louisiana division of the Travelers' Protective Association have declared in favor of returning to private ownership all railroads now operated by the government.

The Veteran Employees' Association of the Pittsburgh Division of the Pennsylvania Railroad held its annual reunion at Pittsburgh on May 16, with about 400 members in attendance. Among the enginemen present was Frederick Fleck, 90 years old, who entered the service of the railroad in 1854.

The Broadway Limited express of the Pennsylvania Railroad, running between New York and Chicago, 906 miles, in twenty hours, is to be restored on Sunday next. This train was discontinued on December 1, 1917, to relieve the congestion of traffic and to facilitate prompt movement of troops and government supplies.

The Brotherhood of Railroad Trainmen, at its convention at Columbus, Ohio, has adopted resolutions endorsing the proposed League of Nations, and requesting a new trial for Thomas J. Mooney, convicted in the San Francisco bomb plot. Among the speakers scheduled to address the convention was D. G. Robertson, Canadian Minister of Labor.

Damages to the amount of \$900,060.34 were awarded in the suit of the Bethlehem Steel Company, tried at Jersey City, N. J., last week, to recover \$2,900,000 for loss of ammunition destroyed by the explosion at "Black Tom," July 30, 1916. The defendant was the Lehigh Valley Railroad Company, and the trial was before Judge William H. Speer, of the Supreme Court. The damages granted were for the ammunition contained in sixteen cars, the jury not allowing damages of about \$2,000,000 for explosives on barges.

The Brotherhood of Railway Clerks, in convention at Cincinnati, has adopted resolutions in favor of the establishment of a union of all railroad workers; also one in favor of government ownership of railroads. The name of the organization has been changed so as to include express and steamship clerks, and it now reads "The Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station House Employees." The convention voted to pay the grand president ten thousand dollars a year; the grand secretary \$7,500; the grand vice-presidents, \$4,000 each; organizers, \$3,600 each; editor of The Clerk, \$3,600. The salary of the grand president heretofore has been \$3,500. Charles M. Owens, of Cincinnati, has been elected grand secretary. On Tuesday of this week, Walker D. Hines, director general of railroads, addressed the convention. In Portland, Me., on May 20, "The Brotherhood of Railroad Station Employees" opened its biennial convention.

The first sleeping cars in America—in the world—were those which were run on the Cumberland Valley between Chambersburg, Pa., and Harrisburg, in 1836 or 1837. This fact, stated for the purpose of correcting an error, is brought out in an interesting letter to the Philadelphia Record by M. C. Kennedy, president of the Cumberland Valley. And he calls attention to the fact that those two sleeping cars were kept in service more than 10 years, or until 1848. Chambersburg and Harrisburg are only about 52 miles apart, but by running a train at night, the Cumberland Valley accommodated passengers arriving in Chambersburg by stage in the evening from the west who wished to take the early train the next morning from Harrisburg to Philadelphia. Another historical date which is frequently misstated is that of the first mail car. In connection with the recent hearing at Washington on the subject of railway mail pay, it was stated that no attempt was made to distribute letters on the cars until 1862; but the fact is that a mail car was running between Boston and Albany in 1853. W. A. Davis, the clerk who is credited with having distributed letters between Quincy and St. Joseph, in 1862, is said to have copied the idea from England, by way of Canada, and it may be that the English post office sorted letters on the cars before 1853.

Atlantic City Exhibit

Secretary J. D. Conway, of the Railway Supply Manufacturers' Association, advises that the following firms have been allotted space in the exhibit for the mechanical conventions at Atlantic City, June 18-25. These are in addition to lists given in the *Railway Age* of April 18 and May 2:

American Car & Foundry Company.....	New York.
Brosius, Edgar E.....	Pittsburgh, Pa.
Detroit Graphite Co.....	Detroit, Mich.
Dixon Valve & Coupling Co.....	Philadelphia, Pa.
Kaustine Company, Inc.....	Buffalo, N. Y.
Loco, The, Light Co.....	Indianapolis, Ind.
Macbeth-Evans Glass Co.....	Pittsburgh, Pa.
Pulverized Fuel Equipment Corp.....	New York.
Safety, The, Nut & Bolt Co.....	Cleveland, O.

Special Train from Chicago to Mechanical Convention

Arrangements have been made for a special train to accommodate railroad men from Chicago and points west who will attend the convention of the mechanical section of the American Railroad Association at Atlantic City, N. J., June 18 to 25 inclusive. The train will leave Chicago at 3 p. m., June 16, and will arrive at Atlantic City about 5 p. m., June 17. The train will have club and dining cars, 12-section drawing room sleepers and 7-compartment drawing room cars. The diagrams are now open, and requests for reservations should be addressed to C. L. Kimball, 175 W. Jackson boulevard, Chicago.

Michigan Railroad Commission Abolished

The Lemire-Brower bill abolishing the railroad commission and creating in its stead a public utilities commission has been signed by Governor A. E. Sleeper of Michigan. The railroad commission automatically went out of existence with the signing of this bill. The members of the railroad commission were C. L. Glasgow of Nashville, A. A. Keiser of Ludington, and Charles S. Cunningham of Detroit. Four of the five members of the new commission have been appointed, as follows: William M. Smith of St. Johns, Chairman of the Industrial Accident Board; Samuel Odell of Shelby, state treasurer; William Potter of Hastings, and Sherman Handy of Sault Ste. Marie. The salaries of the commissioners are \$7,000 a year, while the railroad commissioners received only \$3,000.

Freight Car Economy—Revised

R. H. Aishton, regional director of the Northwestern region, in a recent letter stated that since the Food Administration has released its control over the loading of certain food stuffs, requiring cars to be loaded to full capacity, but 85 per cent of the capacity of cars in his region has been utilized in flour loading. "Had cars been loaded in March," said Mr. Aishton, "on the same basis as in December, the flour sent out from Minneapolis could have been carried in 1,207 fewer cars; that is to say, a saving of 20 per cent in cars; and the cost of movement was, of course, increased."

Society of Terminal Engineers

At the annual meeting of the Society of Terminal Engineers, held in New York on May 20, Francis Lee Stuart, who at various times has been chief engineer of the Erie and of the Baltimore & Ohio, and who was until recently chairman of the Engineering Committee of the Railroad Administration, was elected president for 1919 and 1920. The other officers elected were: Vice-presidents, John Meigs, E. H. Lee, Calvin Tomkins, Charles Whiting Baker and Maurice W. Williams; treasurer, W. Joshua Barney, and secretary, J. H. Leonard. The directors elected were General William H. Bixby, U. S. A.; B. F. Cresson, Jr.; Harwood Frost, H. McL. Harding, Richard Devens, George H. Kimball, M. A. Long, S. H. Libby, George E. Titcomb, T. Kennard Thomson, Edward Anderberg, Charles A. Rohr, H. C. Yost, Charles C. Hurlbut, R. H. McLain and R. H. Marriner.

Shipping Day Notice

The Pennsylvania Railroad has issued a revised list of shipping days for freight brought, for transportation by rail, to its five receiving stations in New York City, and on the first page prints the following notice:

"Shipping days provided herein for the receipt and forwarding of less than carload freight are established as a Preferred Service Schedule. Shippers have the right to route shipments over any line at the legal rates applicable, and of delivering freight at point of origin to such carrier on any week day, except holidays, during the established hours of service. It should be understood, however, that more satisfactory service will be obtained by delivering shipments on the shipping days specified, as if delivered on other days, freight cannot be given the full benefit of the preferred service schedule."

Winnipeg Strike

A strike of metal workers at Winnipeg, Man., at the beginning of last week, was followed on Thursday, May 15, by sympathetic strikes in numerous other lines of work, so that 30,000 men and women were out; and among the strikers were the city firemen, and employees of the gas and water-works. More than sixty unions joined in the movement on one day. A general suspension of business resulted, but committees of strikers allowed delivery of bread and milk, and refrained from interfering with certain other essentials. This week reports indicated that railroad shopmen, clerks in railroad shops, dining-car conductors, and some other railroad employees had joined in the movement; and striking operators blocked business in the telegraph offices so completely that reporters went to other towns to send out news of what was going on. Railroad brotherhoods, not only at Winnipeg, but at other places in Canada, held meetings and adopted votes of sympathy, but no definite action of large bodies of railroad men has yet been reported.

Press despatches are contradictory and confusing. As we go to press the Associated Press says:

"Both labor leaders and employers believe that the critical period in the general strike has passed and that a settlement of the differences is in sight. Mayor Charles F. Gray is endeavoring to arrange for a meeting of union representatives and heads of the iron industry. A delegation of 24 men, representing the railway trainmen, on Wednesday urged the

Provincial Government to act as conciliator and bring about industrial peace as soon as possible. There was no difficulty in maintaining order when, on Wednesday, many business concerns resumed activity. The strong force of mounted police on duty and thousands of troops mobilized in barracks has restrained any semblance of disorder. Hundreds of citizens have signed for vigilance service."

Order of Railroad Station Agents

The Order of Railroad Station Agents held its annual meeting at Washington this week, about 100 delegates being present. Resolutions were adopted asking Congress to retain the railroads under government control for the full period of 21 months after the proclamation of peace. Another resolution was adopted authorizing E. H. Morton, of Boston, president of the organization, to confer with other railroad labor organizations in an effort to unite all railroad labor organizations into one body to be known as the United States Railroad Federation or by some similar title.

Officers of various railroad labor organizations addressed the convention. A resolution was adopted demanding that a request be made of the director general that an early ruling be made as to what constitutes a supervisory agent, that the railroads may make a uniform adjustment. It was further resolved that as Supplement No. 13 recognizes the supervisory agent, the director general should order an adjustment made retroactive to the effective date of that supplement as of October 1, 1918.

Railroad Y. M. C. A. Membership Week

Reports received just as we are going to press indicate that the membership campaign of the Railroad Y. M. C. A., which is being carried on this week, will go "over the top." The following message was sent by Director General Hines to W. E. S. Griswold, one of the members of the International Committee, Railroad Department:

"I have recently learned that the Railroad Y. M. C. A. has set apart the week from May 18 to 24 as membership week, when they plan to increase their membership from about 110,000 to 150,000 railroad men. I also understand that following this membership campaign, the railroad department of the Y. M. C. A. is planning a movement among railroad men, including among other admirable features emphasis upon patriotism, thrift and health. I am very strongly of the opinion that the Railroad Y. M. C. A. is rendering a practical and helpful service which is appreciated by railroad men, railroad managements and the United States Railroad Administration. It affords me pleasure, therefore, to endorse the program in contemplation, and I will await with real interest further information as to its success."

To make things interesting, Elisha Lee, federal manager of the Pennsylvania Railroad, who is at the head of the Railroad Y. M. C. A. extension movement on that system, challenged C. W. Galloway, federal manager of the Baltimore & Ohio, as follows:

"At a meeting of the executive committee of the Pennsylvania Railroad, Eastern Lines, in connection with continental extension program of the Railroad Department Y. M. C. A., I, as system chairman, was directed to issue to the Baltimore & Ohio Railroad lines under your charge a challenge that the lines under my jurisdiction as system chairman will fill their quota before the lines under your jurisdiction. Please wire me if you accept the challenge."

Mr. Galloway, who is at the head of the Y. M. C. A. extension movement on the Baltimore & Ohio, replied to this challenge with this telegram:

"Answering your telegram 12th. With such friendly rivalry, contest becomes interesting, and we cheerfully accept your challenge. Your usual high speed will have to be increased to catch us."

The quota on the Baltimore & Ohio is 5,500 men, and this means that it will be necessary to renew the present membership of 3,000 and secure not less than 2,500 new members. The Pennsylvania Railroad has an equally difficult task to perform.

Railroad Employees' Subscriptions to Victory Loan

Officers and employees on railroads under government control throughout the United States subscribed a total of \$138,637,250 to the Victory Liberty Loan. The returns from the seven regional directors show that out of a total of 1,841,267 employees, 1,417,042, or 77 per cent., subscribed to the loan. Employees on 13 roads showed subscriptions of 100 per cent. The Lehigh Valley, with a total of 20,295 employees, shows 100 per cent. Railroad officials and employees subscribed a total of \$184,868,300 to the Fourth Liberty Loan. General offices of regional directors of Southern, Pocahontas, Allegheny, Southwestern and Northwestern regions subscribed 100 per cent. The general office of the Central Western region 99 per cent, and the general office of the Eastern region 96.8 per cent. Details are shown in the table:

Region	Officers and general office employees		Agents and station employees		Engineers and firemen		Conductors		Other trainmen	
	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount
Eastern	96.8	\$5,739,200	85.9	\$5,094,150	77.9	\$2,505,750	87.6	\$1,416,750	70.4	\$1,734,150
Southern	84.1	2,643,350	48.2	1,965,750	38.9	796,400	57.9	581,450	41.4	644,700
Pocahontas	83.9	386,750	63.2	384,200	53.1	285,200	70.	160,650	45.0	152,300
Allegheny	83.56	3,918,850	84.38	3,029,350	65.61	1,803,200	75.32	980,000	57.17	1,291,550
South Western	85.4	2,604,050	79.7	1,562,400	68.1	809,650	68.9	462,200	57.9	571,900
North Western	97.	3,126,850	92.	2,923,200	72.	1,709,600	91.	980,550	73.	1,325,550
Central Western	99.	4,605,200	89.	3,703,880	80.	1,991,750	89.	949,050	81.	1,437,550
		\$23,024,250		\$18,662,930		\$9,901,550		\$5,530,650		\$7,157,700

Region	Mechanical		Roadway department		Miscellaneous		Total amount subscriptions	Total number employees on roll	Total sub-scribing	Per-cent-age
	Per cent	Amount	Per cent	Amount	Per cent	Amount				
Eastern	89.5	\$9,486,900	85.2	\$5,223,700	87.1	\$2,383,450	\$33,584,050	400,219	344,715	86.1
Southern	58.5	3,458,300	29.9	1,520,250	57.6	934,800	12,545,000	264,804	128,387	48.48
Pocahontas	77.6	1,238,550	62.3	450,050	78.3	289,000	3,346,700	50,365	34,598	68.69
Allegheny	79.47	7,676,150	79.36	3,627,300	74.07	2,585,100	24,911,500	382,445	294,417	76.99
South Western	81.2	3,498,450	51.2	1,935,900	70.5	2,800,750	12,245,700	173,595	119,673	68.9
North Western	80.	5,261,050	80.	3,635,450	90.	1,542,700	20,504,950	248,057	204,748	82.54
Central Western	91.	8,186,110	84.	4,762,240	93.	2,315,250	27,951,050	300,580	266,001	88.5
Pullman Car Lines.....							1,696,300	21,061	20,759	98.1%
Coastwise Steamship Cos.							181,150		2,364	
Mississippi-Warrior Waterways ..							9,600			
New York-New Jersey Canal Section..							14,300	141	138	97.87
RR. Admin. (Ship Bd. Fund).....							863,000			
Cent. Admin. (Wash. Office).....							605,250	1,287	1,287	100.
Cent. Admin. (Regional Office).....							168,700			
		\$38,805,510		\$21,154,896		\$12,851,050	\$138,637,250			77.

Golden Spike Celebration

The celebration at Ogden, Utah, on May 10, of the fiftieth anniversary of the completion of the first trans-continental railway in the United States was noticed in the *Railway Age* last week, page 1227. It drew together hundreds of veteran railroad men who were connected with the project and who related their recollections of the disappointments and discouragements met in the construction of the line and of its final success. These veterans were all guests of the city, and it was around them that the plans for the celebration were built.

The celebration was planned to be fully in keeping with the historical event, news of which, at 2:47 p. m., May 10, 1869, was flashed to Washington from Promontory, Utah, by the one word, "Done." This message was followed by three taps on the telegraph key, each given as the maul struck the golden spike; and these were repeated on the bell in the capitol at Washington proclaiming to the nation that the American continent had been successfully spanned. The message confirming this preliminary signal was signed by Leland Stanford, governor of Colorado; T. C. Durant, then president of the Union Pacific; Sidney Dillon, and John Duff, and said:

"The last rail is laid! The last spike is driven! The Pacific Railroad is completed! The point of junction is 1,086 miles west of the Missouri river and 690 east of Sacramento City." This message and many other relics of the event were lent to the city of Ogden by the Union Pacific Railroad Company and were on exhibition.

The building of the Pacific Railroad was begun at Omaha by the Union Pacific and at Sacramento by the Central Pacific on January 8, 1863. The large government subsidies stimulated all concerned to the highest speed, and the laying of the track became a race between the Union Pacific and the Central Pacific. The Golden Spike was presented by

Doctor H. Herves, of San Francisco, and was made from 23 twenty-dollar gold pieces.

A prominent feature of the celebration was a great open air meeting for the pioneer railroad men at which addresses were given by Governor Simon Bamberger, of Utah; Paul Shoup, vice-president of the Southern Pacific Company, and William Hood, chief engineer of the Southern Pacific Company. Mr. Hood is a veteran of the trans-continental line, having entered the service of the Central Pacific in May, 1867, two years before the completion of the main line.

Exhibitors at Fuel Convention

Following is a list of the exhibits at the convention of the International Railway Fuel Association, which was held in Chicago this week at the Hotel Sherman:

American Arch Company, New York, N. Y.—Security sectional arch.

Represented by W. L. Allison, John Neff, R. J. Himmelright, A. W. Clokey, C. T. Pfeiffer, J. T. Anthony, J. L. Nicholson, Minot R. Smith and W. E. Salisbury.

Anchor Packing Company, Chicago.—Packing for locomotives and power plants. Represented by John Landreth.

Barco Manufacturing Company, Chicago.—Three-V type metallic connections between engine and tender for air, steam and water; metallic steam heat connections between passenger cars; air reservoir joints, headlight generator joints, automatic smokebox blower fitting, joints for roundhouse blower and blow-off, coach yard and station metallic sets, and joints for expansion. Represented by F. W. Bard, C. L. Mellor and E. K. Carl.

Bird-Archer Company, The, New York.—Harder circular plate and boiler chemicals. Represented by P. B. Bird, L. F. Wilson, J. A. McFarland, C. A. Bird, John Callahan and C. J. McGurn.

Broschart Threadless Pipe Coupling Company, Trenton, Mo.—Emergency train-line repair coupling. Represented by J. L. Broschart.

Detroit Lubricator Company, Detroit, Mich.—Lubricators and flange oiler. Represented by A. D. Homard.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite and graphite products for railroad service. Represented by H. E. Hewson and F. R. Brandon.

Edna Brass Manufacturing Company, Cincinnati, O.—Lubricators, injectors and boiler checks. Represented by H. A. Glenn, D. B. Joseph and M. J. Mullen.

Fairbanks, Morse & Co., Chicago.—Literature on locomotive coal handling and storage plants.

Franclare Company, Chicago.—Hand-fired, self-cleaning stoker for power plants. Represented by C. H. Buck, Mr. Varney and Mr. Miller.

Franklin Railway Supply Company, New York.—Franklin butterfly door, engine and tender trucks, radial buffer and adjustable driving box wedge. Represented by W. C. Coyle, J. L. Randolph, C. W. Floyd Coffin, J. Sinkler, S. D. Rosenfelt and H. M. Evans.

Fuller Engineering Company, Allentown, Pa.—Literature on pulverized coal equipment.

Garlock Packing Company, The, Palmyra, N. Y.—Special packings for general railroad uses. Represented by W. G. Cook and C. W. Sullivan.

Gillespie, A. W., & Co., Chicago.—Economy locomotive firedoor. Represented by A. W. Gillespie and J. S. Seeley.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Cylinder bushings, cylinder packing, valve packing, piston bull-rings, valve bushings, rod bushings and crosshead shoes. Represented by V. W. Ellet and E. J. Fuller.

Johns-Manville Company, H. W., New York.—Asbestos pipe and boiler insulation, steam traps, monolithic baffle walls, boiler wall coating, refractory cements, packings. Represented by J. C. Younglove, G. A. Nicol,

P. C. Jacobs, H. M. Butters, E. H. Willard, D. L. Jennings and P. R. Austin.

Leslie Company, The, Lyndhurst, N. J.—Steam heat regulators and removable injector coupling nuts. Represented by S. I. Leslie and J. J. Cizck.

Locomotive Feedwater Heater Company, New York.—Represented by W. L. Allison, E. A. Averill and W. T. Rennison.

Locomotive Firebox Company, Chicago, Ill.—Nicholson Thermic syphons. Represented by John L. Nicholson, Charles E. Hawley, Stuart Hawley and J. T. Anthony.

Locomotive Pulverized Fuel Company, New York.—Represented by Col. Donald McKay and C. M. Hatch.

Locomotive Stoker Company, Pittsburgh, Pa.—Photographs of duplex locomotive stoker. Represented by D. F. Crawford, W. G. Clark, A. N. Wilsie, O. B. Capps, D. T. Carlisle, J. J. Byrne, E. F. Milbank, C. E. Petersen, Ira Jordan, Eugene Prouty, R. G. Kelly and E. R. Funk.

Locomotive Superheater Company, New York.—Represented by R. M. Osterman, R. R. Porterfield, George Fogg, B. G. Lynch, H. J. Spicer, R. J. Van Mater and G. E. Ryder.

Manning, Maxwell & Moore, Inc., New York.

Nathan Manufacturing Company, New York.—Injectors, lubricators, boiler check, gage cocks, non-lifting coal sprinkler. Represented by Otto Best, Richard Welch, W. R. Walsh and F. C. Davern.

National Railway Devices Company, Chicago.—Shoemaker vertical fire-door. Represented by Jay G. Robinson and A. F. Lind.

Ohio Injector Company, Chicago.—U. S. Standard injector, Chicago non-lifting injector, Ohio injector, Chicago lubricator, Chicago flange oiler, Chicago automatic drifting valve, Ohio water glass protector, Ohio boiler checks and Ohio feed hose strainer. Represented by A. C. Beckwith.

Okadee Company, The, Chicago.—Okadee blow-off valve, water glass protector, tank hose coupler, blower valve, front end hinge. Represented by A. G. Hollingshead, Harry Vissering, Charles R. Long, Jr., G. S. Turner and W. H. Heckman.

Pocket List of Railroad Officials, New York.—Represented by Charles L. Dinsmore.

Pyle-National Company, The, Chicago.—Incandescent electric lighting, turbo-generators, headlight cases and accessories. Represented by George E. Haas, William Miller and J. Will Johnson.

Railway Review, Chicago.

Reordway Company, The, Chicago.—Detrick suspended arch, Drake non clinking furnace blocks, Hogan ash conveyor. Represented by Tom Gaughan and R. C. Warner.

Roberts & Schaefer Company, Chicago.—Photographs of coaling stations and sanding plants. Represented by Clyde P. Ross.

Signalite Manufacturing Company, Chicago.—Kerosene carburetors. Represented by G. A. Bauer.

Simmons-Boardman Publishing Company, New York.—*Railway Age* and *Railway Mechanical Engineer*. Represented by A. F. Stuebing, L. B. Sherman, J. M. Rutherford and N. H. Crossland.

W. S. Tyler Company, The, Cleveland, O.—Draftae spark arrester. Represented by J. H. Jackson and A. D. Busch.

U. S. Metallic Packing Company, Philadelphia, Pa.—Models of single and tandem Kink type packing. Represented by M. B. Brewster and H. E. Hyslop.

Vissering Company, Harry, Chicago.—Viloco fire-door, Leacy and Viloco sanders, Crescent metallic piston rod and valve stem packing, steam compression governor. Represented by G. S. Turner, Harry Vissering, Charles R. Long, Jr., and W. H. Heckman.

Vulcan Fuel Economy Company, Chicago.—Line of combustion instruments, Vulcan-Lastite boiler coating and metal protector. Represented by F. A. Moreland.

Vulcan Soot Cleaner Company, Du Bois, Pa.

Western Railway Club

The Western Railway Club on May 19 elected the following officers: President, G. S. Goodwin, mechanical engineer, C., R. I. & P.; first vice-president, J. Purcell, assistant to federal manager, A., T. & S. F.; second vice-president, E. J. Brennan, superintendent of motive power, C., M. & St. P.; secretary-treasurer, J. M. Byrne, chief clerk to mechanical assistant, Central Western Region; directors, E. B. Hall, assistant superintendent of motive power and car department, C. & N. W.; L. S. Kinniard, superintendent of motive power, C. & E. I.; W. H. Flynn, superintendent of motive power, Michigan Central.

Purchasing Agents' Section

The general committee of the newly organized Section 6 of the American Railroad Association (purchasing and distribution of supplies), held a meeting at New York on Friday, May 16, for the purpose of electing officers. H. S. Burr, superintendent of stores, Erie railroad, and formerly president of the Railway Storekeepers' Association, was elected chairman of the Section. E. J. Roth, manager, stores section, Division of Purchases of the Railroad Administration and formerly vice-president of the Storekeepers' Association, was elected vice-chairman of the Section, and J. P. Murphy, general storekeeper, New York Central (Lines West) and former secretary of the old association, was elected secretary for Section 6. Sixteen committees were organized to carry out the work of this section.

Traffic News

G. J. Vizard, heretofore assistant general freight agent of the Erie, at Chicago, has been appointed manager of the traffic bureau of the Little Rock (Ark.) Board of Commerce.

J. S. Thompson has been appointed district manager of the Southern Hard Wood Traffic Association in charge of the branch office at Louisville, Ky., effective June 1, to succeed R. R. May, resigned.

The peach crop of Georgia is expected to furnish for the Central of Georgia Railroad this year 6,000 carloads. Not much fruit will be shipped before June 1.

Reduced Fares for Conventions

Special rates of two-thirds of the usual round trip fares will be put into effect soon by the Railroad Administration for religious, fraternal and educational meetings. Regional directors will decide as to each convention, whether it is truly religious, fraternal or educational in nature.

A Self-Adjusting Time Table

[From the Alaska Railroad Record.]

New schedules for trains on the Alaska government railroad are announced to go into effect on Monday, April 21.

Service between Anchorage and Chickaloon will be twice weekly. Trains will leave Anchorage at 8:30 a. m. Mondays and Fridays; arrive at Chickaloon 4:15 p. m. Returning from Chickaloon, . . . Tuesdays and Saturdays. Service will be given once a week between Anchorage and Talkeetna; leave Anchorage at 8 a. m., Wednesday, and arrive at Montana the afternoon of the same day. At Montana, without delay, passengers, mail and baggage will be transferred to a motor passenger car, which will proceed to Talkeetna, arriving there the same afternoon. The motor car will return to Montana later in the afternoon, and the next morning the steam train will leave Montana for Anchorage * * *. The service between Anchorage and stations on Turnagain Arm will be given once a week. The train will not be operated on any definite day of the week, but whenever traffic warrants service.

Engineering Council Calls for

Water-Power Legislation

Engineering Council, through its National Service Committee, M. O. Leighton, chairman, Washington, D. C., is urging upon engineers the importance of exerting influence to promote legislation by Congress to open up for development the water power sites of the United States. These sites are of two classes: (1) those privately owned on non-navigable streams, and (2) those on public lands or on navigable streams. The first class can be developed by the owners after complying with local laws, and over 25 per cent of these possible sites have been developed. Those of the second class cannot be developed without a permit from the United States, and less than 4 per cent of them are being utilized today. Bills to remedy this situation have been introduced in Congress at every session since 1910. Twice bills have been passed in different forms by both houses of Congress and sent to conference, and once (in the last Congress) an agreement was reached by the Conference Committee. These bills have given rise to extensive debate and a large amount of testimony and information is available in printed form, constituting an exhaustive study of the entire subject of hydro-electric development in this country and the laws relating thereto.

Engineers are asked to urge this matter on their Congressmen with a view to conserving fuel and labor. If engineers will show sufficient interest in this subject Congress may be expected to give it attention at the session now opening.

Commission and Court News

Increase in Rates Made in

Competition With Water Routes

By the Act to Regulate Commerce, Sec. 4, "whenever a railroad in competition with a water route reduces a rate on freight to or from competitive points, it must not increase such rate unless the Interstate Commerce Commission finds that the proposed increase rests upon changed conditions other than the elimination of water competition." On August 21, 1916, a suit was brought in Oregon to enjoin an increase in rates on iron and steel from Pittsburgh to Seattle. The United States, the Commission and 16 railroads were joined as defendants. On appeal to the Supreme Court of the United States from judgment in the district court for Oregon dismissing the bill, the shipper's main contention was that, as the railroads had in 1916 reduced the rate from 80 cents to 65 cents, neither they nor the Commission had power to increase the rate without a prior finding by the Commission upon proper hearing "that such proposed increase rests upon changed conditions other than the elimination of water competition," and that no such hearing had been had or finding made.

In affirming the judgment of the district court, the United States Supreme Court, by Mr. Justice Brandeis, says that despite the original Act to Regulate Commerce and all amendments, railroads still have power to fix rates as low as they choose. The Commission's power over them in this respect extends no further than to discourage the making of unduly low rates by applying deterrents. It may forbid unjust discrimination, but the carrier under such an order may either raise the lower rate or lower the high one.

The last paragraph of section four (the long and short haul section) which was added by the Act of 1910, was designed to prevent the railroads from killing water competition by making excessively low rates. But Congress refrained from forbidding the carrier to reduce the rate and declined to confer upon the Commission power to prevent a direct action by reduction. The act still leaves the carrier absolutely free to make as low a rate as it chooses. This provision may become operative in any case where there has been competition between a railroad and a water line, inland or coastwise. But the question here is whether the prohibition applies where the rates were reduced with the approval of the Commission, given after hearing, by order entered on application of the carrier for relief from the operation of the fourth section (to meet competition via Panama canal).

It is held that the construction contended for by the plaintiff would rather ensure monopoly than preserve competition. If, contrary to the Commission's expectation, a rail rate reduced in competition with a water route for the avowed purpose of preserving competition by rail should result in eliminating the water competition, because so low as to drive the water carrier out of business, then the prohibitively low rate would have to be continued permanently and other water competition be thereby prevented from arising; unless, perchance, some changed condition should develop which might make removal of the bar possible. Or, if the reduction in the rail rate, sanctioned by the Commission under the fourth section as not unjustly discriminating against intermediate points, because forced upon the rail carrier by oppressive water competition designed to destroy its business to the port, should become thereafter unjustly discriminatory, because the water carrier, destroyed by its own rate cutting, abandoned the route, still the low rail rate and resulting discrimination would have to continue. Only compelling language could cause the court to impute to Congress the intention to produce results so absurd; and the language of the last paragraph is held to be clearly susceptible of the more reasonable construction contended for by the defendant carriers. *Skinner & Eddy Corporation v. United States*. Decided May 5, 1919.

Equipment and Supplies

Cars Accepted

The Pittsburgh, McKeesport & Youghiogheny has accepted 194 of the U. S. R. A. 70-ton gondola cars built by the Pressed Steel Car Company, making a total of 500 of these cars which it has accepted. These are the only standard cars accepted during the three weeks ended May 10.

Locomotives

THE NORWEGIAN STATE RAILWAYS are reported as having ordered 16 locomotives from the Baldwin Locomotive Works, and as having placed orders in this country also for a quantity of car wheels and axles.

Passenger Cars

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for several electrically lighted passenger coaches of modern construction, with toilets and water tanks, seating capacity of 48 or more, and weighing about 15 tons. The coaches must operate around a 28 deg. curve.

Locomotive Deliveries Week Ended May 3

New locomotives were shipped to railroads under federal control during the week ended May 3, as follows:

Works	Road	Number	Type
American	N. & W.	8	USRA Mallet.
	P. L. W.	27	USRA Santa Fe.
	Southern	6	USRA Mount.
	C. B. & Q.	4	USRA 6W. Sw.
		45	
Baldwin	C. B. & Q.	2	Mikado.
	C. B. & Q.	2	USRA Mikado.
	C. B. & Q.	4	Santa Fe.
	P. R.	1	Mallet.
	T. & P.	2	Pacific.
	A. T. & S. F.	1	Mikado.
	A. T. & S. F.	1	Mountain.
	B. & O.	3	USRA 6W. Sw.
	E. J. & E.	4	USRA 8W. Sw.
	N. & W.	1	Mallet.
	L. V.	1	Pacific.
	S. P.	1	Santa Fe.
		23	
Total		68	

Locomotive Deliveries Week Ended May 10

The following locomotives were shipped to railroads under federal control during the week ended May 10:

Works	Road	Number	Type
American	N. & W.	3	USRA Mallet
	Penn. L. W.	4	USRA Santa Fe
	Southern	2	USRA Mountain
	N. & W.	7	USRA Mountain
	C. B. & Q.	2	USRA 6-w. Sw.
	Erie	1	USRA Pacific
	L. & N.	1	USRA Pacific
	P. L. W.	2	USRA 6-w. Sw.
		22	
Baldwin	Southern	4	USRA Mountain
	Ft. W. & D. C.	4	USRA Mikado
	Southern Pacific	2	Santa Fe
	A. T. & S. F.	1	Mikado
	I. H. B.	2	USRA 8-w. Sw.
	T. & P.	1	Pacific
	B. & O.	6	USRA 6-w. Sw.
	C. B. & Q.	1	Santa Fe
	T. & P.	4	Santa Fe
	C. B. & Q.	1	Mikado
		26	

Delivery of Standard Cars to April 30

The table on the following page gives a list of standard car deliveries to April 30:

Delivery of Standard Cars to April 30

Type	Contract number	Manufacturer	A. C. L.	B. & E.	B. & P.	C. C. & O.	C. C. & W.	C. & N. W.	C. B. & O.	C. C. & S.	I. C. & K.	M. & L.	N. & M.	M. & O.	M. P. & S.	N. C. & S.	N. Y. C.	N. H. & H.	N. & W.	P. M. & Y.	S. P.	T. & O. C.	Total
40 Ton D. S. Box...	8,571	Am. Car & Fdy. Co.	450	...	...	...	...	1,250	500	...	...	...	...	...	...	16	500	...	...	...	...	...	2,716
40 Ton D. S. Box...	8,572	Am. Car & Fdy. Co.	300	...	...	...	...	...	750	...	...	...	...	...	...	...	500	...	...	...	...	...	1,800
40 Ton D. S. Box...	8,573	Am. Car & Fdy. Co.	200	...	...	...	...	...	...	...	...	...	...	...	...	...	500	...	...	...	...	...	500
40 Ton D. S. Box...	8,589	Am. Car & Fdy. Co.	...	...	...	...	...	...	250	...	...	...	...	...	...	...	...	...	...	...	...	...	250
Total...																							5,266
50 Ton S. S. Box...	8,574	Am. Car & Fdy. Co.	...	...	...	...	...	500	...	...	...	...	...	500	...	...	1,000	...	...	500	100	...	1,600
50 Ton S. S. Box...	5,179	Haskell & Barker	...	...	...	...	...	500	...	...	...	...	...	500	...	...	...	...	...	...	...	...	2,300
50 Ton S. S. Box...	5,294	Pullman Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,700
50 Ton S. S. Box...	14,144	Pittendouf Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	300
Total...																							5,900
50 Ton Comp. Gon...	8,576	Am. Car & Fdy. Co.	...	...	...	...	...	500	250	...	...	...	250	200	...	...	250	...	...	...	...	...	1,650
50 Ton Comp. Gon...	8,577	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	400
50 Ton Comp. Gon...	8,578	Am. Car & Fdy. Co.	50	...	...	...	...	...	...	...	...	...	150	200	...	...	250	...	...	...	...	...	400
50 Ton Comp. Gon...	5,178	Haskell & Barker	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,000
50 Ton Comp. Gon...	00-131	Pressed St. Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2,200
50 Ton Comp. Gon...	11,503	Standard Steel Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	950
Total...																							6,600
55 Ton St. Hop...	8,579	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,200
55 Ton St. Hop...	8,580	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	150
55 Ton St. Hop...	00-603	Pressed St. Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2,750
55 Ton St. Hop...	5,295	Pullman Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,750
55 Ton St. Hop...	6,000	Railton St. Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	800
55 Ton St. Hop...	D5,108	Standard Steel Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2,200
Total...																							8,850
70 Ton St. Hop...	00-604	Pressed St. Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	954
Grand total...			1,250	500	800	1,050	300	3,250	1,500	2,000	300	400	2,000	500	2,000	2,000	500	1,500	800	954	1,000	750	27,570

Supply Trade News

Julius Alsberg, consulting engineer, has removed his office from the Tribune building, Chicago, to the Marquette building, 140 South Dearborn street.

The Nathan Manufacturing Company, New York, has opened new offices in Chicago in the Great Northern building, 20 West Jackson boulevard, room 707, with R. Welsh in charge.

In announcing the appointment of E. Roy Borden as service engineer of Mudge & Co., Chicago, in the *Railway Age* of May 16 (page 1232), the name was incorrectly published as E. Roy Gorden.

Vernon T. Brauns, manager of the railroad valuation department of the American Blue Print Company, Chicago, was promoted to general manager of all departments for this company, effective May 8.

Joseph Douglas Gallagher, director, vice-president and general counsel of the American Brake Shoe & Foundry Company, New York, died at his home in Glen Ridge, N. J., on May 20, at the age of 65. He was educated at Princeton University and at Ohio Wesleyan University, Delaware, Ohio. He was engaged in the practice of law in Newark, entering the firm of Whitehead & Gallagher, which later became Gallagher & Richardson. Mr. Gallagher became director and vice-president of the American Brake Shoe & Foundry Company when it was organized about eighteen years ago, and during the last four years was also its general counsel. This company did much work on munitions for the United States Government during the war, and overwork in this connection probably hastened Mr. Gallagher's death, which followed an operation in the Morningside Hospital.



J. D. Gallagher

Paul W. Koch & Company, Chicago, have opened Pacific coast offices in the San Fernando building at Los Angeles, Cal., the Rialto building, at San Francisco, Cal., and the Sherlock building, at Portland, Ore.

J. L. Phillips has been appointed a sales engineer of the Okonite Company, Passaic, N. J. Mr. Phillips for the last nine years has been with the General Railway Signal Company, and before that served in the signal department of the Northern Pacific, for eleven years.

The Duntley-Dayton Company, Chicago, has opened a branch office in the Century building, Cleveland, Ohio, under the management of J. C. Sague. This company has also opened a branch office in the Home Trust building, Pittsburgh, Pa., under the management of W. M. Hankey.

F. X. Meehan has been appointed advertising manager of the Walter A. Zelnicker Supply Company, St. Louis, Mo. Mr. Meehan was associated in various executive capacities with Fairbanks Morse & Co., for six years; the Atchison, Topeka & Santa Fe Railroad, Coast Lines, for two years and the St. Louis Smelting & Refining Works of the National Lead Company for two years.

The American Railway Equipment Company, Pittsburgh, Pa., on May 26, located its general offices in the Liberty building, Philadelphia, Pa., where **G. W. Mingus**, president of the company, will have his office. The company will retain an office in the Diamond Bank building, Pittsburgh, in charge of **R. C. Crawford**.

Ross F. Hayes has been appointed general sales manager of the **Curtain Supply Company**, Chicago. Mr. Hayes has been eastern manager of the company for 12 years, with



R. F. Hayes

headquarters at 50 Church street, New York, and will continue to act as eastern manager and retain his office in New York. Mr. Hayes was born at Lewiston, Me. He entered the service of the Boston Woven Hose & Rubber Company in 1888, remaining with that company for 16 years. He was a salesman in the rubber goods department in New England and New York state until 1893; and then served consecutively as city sales manager of the St. Louis branch for two years; New England representative of the bicycle tire department for two years; southern representative of the mechanical rubber goods department for two years, and as manager of the Philadelphia office until 1904. He then entered the service of the Curtain Supply Company, Chicago, as western representative, and since 1907 has served as eastern manager of the company, as above noted.

W. L. Conwell, whose election as president of the **Safety Car Heating & Lighting Company**, with headquarters at New York, was announced in last week's issue, has been



W. L. Conwell

connected with that company since January, 1916. He was born at Covington, Ky., on January 25, 1877. He received his education in the public schools of Philadelphia and at the University of Pennsylvania, from which he graduated in 1898 with the degree of electrical engineer. He then passed the examination for first assistant engineer for the United States Navy, but received no appointment because of the close of the war with Spain. He was employed in contracting work as a timekeeper for the Tennis Construction Company, Philadelphia, becoming later chief engineer and secretary of the company. In 1901 he resigned to become city salesman of the Westinghouse Electric & Manufacturing Company in New York. He was later placed in charge of the isolated plant department of the company, and for five years, ending in 1911, was engaged in railway work. In that year he became vice-president of the Transportation Utilities Company, and later became also treasurer of the same company. In January, 1916, he was appointed assistant to the president of the Safety Car Heating & Lighting Company, and upon the

death of **R. M. Dixon**, former president of that company in October, 1918, Mr. Conwell was made acting president.

S. Gordon Hyde, who recently received his honorable discharge from service, has been appointed advertising manager of the **Buda Company**, Chicago, with headquarters at Harvey, Ill., to succeed **C. O. Powell**, who has accepted the position of assistant commissioner with the **Association of Metal Lathe Manufacturers**, Chicago.

J. R. Wilson, whose resignation as traffic manager of the Sacramento Northern with headquarters at Sacramento, Cal., was announced in the *Railway Age* of April 11 (page 975), has been appointed vice-president and assistant manager of the **Latourrette-Fical Company**, mechanical contractor at Sacramento, with headquarters in that city.

The **Massey Concrete Products Corporation**, Chicago, has opened a new office at 1405 Oliver building, Pittsburgh, Pa., in charge of **A. F. Humphrey**, resident manager, effective June 1, and **J. A. Higgs, Jr.**, has been appointed resident manager of the Southeastern district in charge of all sales in that territory, with headquarters at the Chandler Annex, Atlanta, Ga.

Oscar F. Ostby, president of the new firm of **Oscar F. Ostby & Co.**, recently incorporated, with offices at 1044 Grand Central Terminal, New York, as announced in last



O. F. Ostby

week's issue, was born on March 5, 1883, and received his education in the public schools of Providence, R. I. From 1901 to November, 1904, he was engaged in publicity work, following which he was connected with the Commercial Acetylene Railway Light & Signal Company, serving as president of the International Acetylene Association during 1910-11. Later, with the Refrigerator, Heater & Ventilator Car Company, serving with the latter as general manager. He has for some time represented the White American Locomotive Sander Company of Roanoke, Va., and since September, 1918, he has served as vice-president of the Glazier Manufacturing Company of Rochester, N. Y. The new firm will continue to handle the railway supplies hitherto handled by Mr. Ostby, and in addition, Mr. Ostby has been appointed exclusive railway distributor for Davidson high speed steel and tools, made by the Davidson Tool Manufacturing Company, New York. Mr. Ostby has been one of the leading members of the Railway Supply Manufacturers' Association and was its president in 1915-1916.

Allied Machinery Company

The Allied Machinery Company of America has increased its capital stock to \$5,000,000. This was made necessary by the decision of the American International Corporation to group all of its machinery export selling subsidiaries under one head. This move contemplates the complete absorption of the Allied Construction Machinery Corporation by the Allied Machinery Company of America. The Allied Machinery Company de France and the Allied Machinery Company d'Italia will retain their corporate entities, but their parent corporation will be the Allied Machinery Company of America rather than the American International Corporation as before. This is also true of the Horne Company, Ltd., of Japan, which was purchased early in the year by the American International Corporation.

All shares of the Allied Machinery Company of America

will, as before, be owned by the American International Corporation.

The Allied Machinery Company of America was formed in 1911 by interests associated with the National City Bank of New York to sell machine tools in Europe. In 1916 it was taken over by the American International Corporation, which immediately set about to expand and organize the business on a large scale. The business has increased rapidly, and today the company is operating in fourteen countries.

J. W. Hook will continue as president of the Allied Machinery Company of America, in general charge of the business. **F. A. Monroe, S. T. Henry** and **T. G. Nee** have been elected vice-presidents. Mr. Monroe is in charge of the administrative affairs of the company. Mr. Henry is in charge of sales and advertising, and Mr. Nee is at present in Japan, devoting his attention to the affairs of the Horne Company, Ltd. **R. P. Redier** is general sales manager of the company, with headquarters at Paris.

Samuel M. Vauclain Awarded

Distinguished Service Medal

At a banquet given in his honor at the Bellevue-Stratford Hotel in Philadelphia on Saturday last, Samuel M. Vauclain, newly elected president of the Baldwin Locomotive Works, was presented by Benedict Crowell, assistant secretary of war, with the Distinguished Service Medal for the part he played in America's mobilization for war. The banquet was attended by some 600. Isaac Johnson, presiding judge of the Delaware County Court, presided, and addresses were made by Governor Sproul, General Muir, General Price, William I. Schaffer, attorney general of the state of Pennsylvania; Frank B. McClain, formerly lieutenant governor of the state, and by Mr. Vauclain.

Newly Elected President of Pulverized

Fuel Equipment Corporation

Colonel Douglas I. McKay has been elected president of the Pulverized Fuel Equipment Corporation, New York, to succeed **John E. Muhlfeld**, who retires to return to consulting engineering practice.

Since July, 1917, Colonel McKay has been engaged in war work. He was commissioned major in the Ordnance Department in charge of the raw materials branch of the gun division and purchased all raw and semi-finished materials used by the ordnance department and contractors for the ordnance department. Between August and December, 1917, these purchases amounted to \$268,000,000.

In January, 1918, he was promoted to lieutenant-colonel in the National Army and appointed assistant director of purchase and supply. Here he had supervision over the purchasing operations of the several supply corps of the War Department, including the ordnance department, the quartermaster department, the medical corps, the corps of engineers and the signal corps. He was subsequently promoted to colonel, and continued in this capacity until he returned to civil life after the armistice was signed.

Colonel McKay is a graduate of West Point. Upon graduation he spent three years in the army, resigning to take the position of deputy chief of the aqueduct police, and six months later was made chief. Three years later he was

called to New York City as first deputy police commissioner, in charge of the business administration of the department, and two years later was appointed police commissioner of New York.

He resigned the commissionership a year later to become assistant to the president of J. G. White Co., Inc., and two years later was elected vice-president and director, which position he held at the time he entered the United States army.

In addition to his duties as president of the Pulverized Fuel Equipment Corporation, Colonel McKay is also vice-president and director of the Chemical Foundation, Inc., director of the International Agriculture Corporation and director of the Botany Worsted Mills.

Railway & Industrial Engineers, Inc.

John E. Muhlfeld, president of the Pulverized Fuel Equipment Corporation, has resigned, and has associated with him several other engineers to form the Railway & Industrial Engineers, Inc., with offices at 25 Broad street, New York, to act as consulting and advisory engineers between the bankers, railroad and industrial corporations. Mr. Muhlfeld for the past five years has been specializing in the development of the "Lopulco" system for burning pulverized fuel in locomotives, stationary boilers and metallurgical and chemical furnaces, and for the past three and one-half years has been president of the Pulverized Fuel Equipment Corporation and the International Pulverized Fuel Corporation, has resigned as president of these corporations to devote his entire time to engineering work. Mr. Muhlfeld retains his interests in and remains a director of the Pulverized Fuel Equipment Corporation.



J. E. Muhlfeld



Col. D. I. McKay

Trade Publications

STEAM JET AIR PUMPS.—Preliminary bulletin No. 113, illustrating and describing the Wheeler steam jet air pump is now being distributed by the Wheeler Condenser & Engineering Company, Carteret, N. J. This steam jet air pump has two or more steam jets working in series with a condenser between the jets, which permits more efficient operation. The pump is applicable to jet condensers, as well as to surface condensers. The bulletin explains the operating principles, gives reasons for high efficiency, describes the inter-condenser and shows an operating test curve. It includes a cross sectional drawing and shows how to connect double machines or triple machines to surface condensers.

STEEL TANKS AND BOILERS.—A cloth bound book of 96 pages, 6 in. by 9 1/4 in., has been published by the Coatesville Boiler Works of Coatesville, Pa., manufacturers of steel tanks for a large variety of uses, A. S. M. E. boilers and stacks, open hearth furnaces, blast furnaces, cement kilns, regenerators, etc., to show the vast scope of the business and the great variety of heavy steel plate work manufactured in the shops of this company. This is indicated in over 100 illustrations. Included in the book are the specifications for steam boilers formulated by a committee appointed by the American Society of Mechanical Engineers, in accordance with which Coatesville boilers are made. The book is designated as General Catalogue No. 240.

Railway Officers

Railroad Administration

Central

W. E. Rosenbaum, chief clerk of the St. Louis Eastern District Freight Traffic Committee of the division of traffic—Eastern Territory, has been promoted to secretary, with headquarters at St. Louis, Mo., to succeed **Edward Hart, Jr.**, who has resumed his duties as assistant general freight agent on the Baltimore & Ohio, with headquarters at St. Louis.

Federal and General Managers

J. D. Hawks, general manager of the Detroit & Mackinac, with headquarters at Detroit, Mich., has been appointed federal manager. This road has been released from the jurisdiction of **F. H. Alfred**, federal manager.

Operating

R. H. Waters has been appointed trainmaster of the Salt Lake Division of the Denver & Rio Grande, with headquarters at Thistle, Utah.

Wm. H. Duwe, inspector of train despatching on the Northern Pacific, at Spokane, Wash., has been promoted to trainmaster, with headquarters at Missoula, Mont.

J. D. Haydon, roadmaster of the Louisville & Nashville with headquarters at Louisville, Ky., has been promoted to superintendent of the Atlanta division with headquarters at Etowah, Tenn., vice **A. B. Bayless**, resigned.

J. E. Craver, superintendent of the Seattle division of the Northern Pacific, at Seattle, Wash., has been appointed acting general superintendent of the Western district, with headquarters at Tacoma, Wash., vice **I. B. Richards**, granted a temporary leave of absence, and **J. E. Campbell**, trainmaster at Seattle, has been appointed acting superintendent of the Seattle division, with headquarters at Seattle, Wash., vice Mr. Craver.

Financial, Legal and Accounting

Paul McKay, corporate treasurer of the Spokane, Portland & Seattle; the Oregon Trunk, and the Oregon Electric Railroad, has been appointed federal treasurer of these roads, with headquarters at Portland, Ore., vice **F. A. Smith**, resigned to accept service elsewhere.

A. H. Mongin, acting federal treasurer of the Green Bay & Western with headquarters at Green Bay, Wis., has been promoted to federal treasurer of this road, the Kewaunee, Green Bay & Western, the Ahnapee & Western and the Waupaca-Green Bay with the same headquarters.

Traffic

H. E. Whittenberger, whose appointment as federal manager of the Grand Trunk, Western Lines, was noted in the *Railway Age* of May 2, has made the following appointments on the Grand Trunk, Western Lines: **Robert L. Burnap**, assistant general freight agent of the Ann Arbor, the Detroit & Mackinac, the Detroit, Bay City & Western, the Grand Trunk, Western Lines, and the Pere Marquette, with headquarters at Chicago, becomes traffic manager of the Grand Trunk, with the same headquarters; **J. D. McDonald** becomes general passenger and baggage agent with headquarters at Chicago; **C. A. Gormaly** becomes division freight agent, with headquarters at Chicago, and **A. Z. Mullins** has been appointed division freight agent, with headquarters at Grand Rapids, Mich.

G. M. Riley, service agent on the Kansas City Southern, with headquarters at Houston, Tex., has been promoted to division freight agent, with headquarters at Shreveport, La.

He was born in Houston, Tex., and began his railway career as a stenographer in the Houston office of the commercial agent of the Southern Pacific at Houston, later working in the auditor's and the superintendent's offices, at the same place. On January 5, 1909, he was promoted to soliciting freight agent for the Kansas City Southern, with headquarters at Houston, which position he held for two years until his appointment as general agent, with the same headquarters. He served in that capacity until the railroads were taken over by the government and the office of general agent was abolished at which time he was appointed service agent for the Kansas City Southern. This office he held until his recent promotion to division freight agent.

Lawrence B. Burford, who has been appointed assistant general freight agent of the Erie Railroad, with headquarters at New York, as has already been announced in these columns, was born in Washington, D. C., and graduated from the high school of his native town in 1897. Four years later he began railway work with the Erie Railroad as a clerk in the car record department of the local freight station at Chicago. He then held various positions in the local and general freight departments until 1907, when he was promoted to chief of tariff bureau, at Chicago, and in 1910 was transferred to New York. He was promoted to general agent in charge of the Baltimore agency in 1911, and four years later was appointed assistant to general traffic manager at New York. In 1917 he was furloughed and served under the British Ministry of Shipping at New York as assistant director until this year. He organized its grain traffic department and directed the inland transportation of supplies of grain and cereals for the Allied governments. He now returns to the service of the Erie as assistant general freight agent, with headquarters at New York.

Benjamin Clifton Prince, whose appointment as assistant traffic manager of the Seaboard Air Line, with headquarters at Norfolk, Va., has already been announced in these columns, was born on August 17, 1877, at Americus, Ga., and in 1894-1895 was a student at Kentucky University, Lexington, Ky. He began railway work on September 1, 1891, as junior clerk to the auditor on the Savannah, Americus & Montgomery, now a part of the Seaboard Air Line. He subsequently served, with the exception of the time spent at college, consecutively in the traffic manager's office on the Chattanooga, Rome & Columbus, and then in the general freight office at Savannah, Ga., of its successor, the Central of Georgia. From 1897 to 1901 he was chief clerk to the traffic manager on the Florida East Coast, at St. Augustine, Fla., and then to 1906 was chief clerk to the division freight and passenger agent on the Central of Georgia, at Chattanooga, Tenn. In 1906 he served as commercial agent on the same road, at Atlanta, Ga. From 1907 to 1911 he was traffic manager of the Georgia, Florida & Alabama, at Bainbridge, Ga., and then to 1914 was assistant general freight agent on the Seaboard Air Line, at Jacksonville, Fla. He was then for four years, assistant to first vice-president, at Norfolk, Va., and since 1918 was assistant to traffic manager, until his recent appointment as assistant traffic manager, of the same road.

Engineering and Rolling Stock

B. H. Prater has been appointed engineer maintenance of way of the Oregon Short Line, with headquarters at Pocatello, Idaho, to succeed **R. B. Robinson**, whose appointment as engineer maintenance of way of the Union Pacific was announced in the *Railway Age* of May 9.

A. A. Woods, superintendent of the New Orleans & Northeastern Railroad and the New Orleans Terminal Company, with headquarters at New Orleans, La., who was appointed chief engineer maintenance of way and structures on the Southern Railway System, Lines West, with headquarters at Cincinnati, Ohio, as announced in the *Railway Age* of April 18, page 1027, was born at New Orleans, La. He graduated from Tulane University at New Orleans, La., in 1895, and entered railway service in July of that year with the New Orleans & Western (New Orleans Terminal Company) as

a rodman on location work. In October of that year he returned to Tulane University to take a post-graduate course. From July 1896, to July, 1897, he was employed as a draftsman in the maintenance of way department of the New Orleans & Northeastern, with headquarters at New Orleans, La., and was later employed as a draftsman in the mechanical department of that road, with headquarters at Meridian, Miss. In January, 1898, he was made assistant engineer on the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, with office at Vicksburg, Miss., and from September, 1899, to November, 1901, he was assistant engineer of the New Orleans & Northeastern with office at New Orleans, La. In November, 1901, he left that road, again entering the service of the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific as engineer maintenance of way. From July, 1913, to February, 1915, he was engineer maintenance of way of the New Orleans & Northeastern, and in February, 1915, he was promoted to superintendent of that road, with headquarters at New Orleans, La. In January, 1917, he became superintendent also of the New Orleans Terminal Company, which position he held until he was appointed chief of the Southern Railway, Western Lines, in April, 1919, succeeding **Curtis Dougherty**, deceased.

Joshua D'Esposito, whose promotion to chief engineer of the Chicago Union Station Company, Chicago, was announced in the *Railway Age* of May 16 (page 1236), was born at Sorrento, Italy, on July 30, 1878. He received his education in naval architecture and marine engineering in the Nautical State School of Italy from which institution he graduated in 1897. Upon his arrival in this country he entered the service of the Pittsburgh Railway Company as a designing engineer, which position he held until the spring of 1904. He entered the service of the Pennsylvania Lines in March, 1905, as a designing engineer, in which capacity he served for two years, being made chief draftsman in 1907. In 1910 he began working on Chicago problems, being transferred to that city in 1913, at the time of the commencement of negotiations with the city of Chicago, which led up to the passage of the ordinances for the Chicago Union station. The following year he was promoted to assistant chief engineer of the Chicago Union Station Company, which position he held until November, 1917, when he was called into the service of the government as assistant manager of the Wood Ship division of the Emergency Fleet Corporation, in charge of the installation of machinery in wooden ships, with headquarters at Philadelphia, Pa. On January 1, 1919, he severed his connection with the Emergency Fleet Corporation and again took up his duties as assistant chief engineer of the Chicago Union Station Company, which position he held until his promotion to chief engineer on May 1.



J. D'Esposito

Purchasing

W. H. Clifton, lumber agent on the Baltimore & Ohio, Eastern lines, has been appointed assistant purchasing agent on the Baltimore & Ohio, Eastern lines; the Coal & Coke, the Morgantown & Kingwood, the Western Maryland, the Cumberland Valley and the Cumberland & Pennsylvania; **D. A. Williams**, general storekeeper of the Baltimore & Ohio, Eastern and Western lines, and the Western Maryland, has been appointed to assistant purchasing agent on all the above-named roads, and **H. P. McQuilkin**, assistant general storekeeper on the Balti-

more & Ohio, Eastern lines, has been promoted to general storekeeper on all the above-named roads; all with headquarters at Baltimore, Md.

Corporate

Traffic

M. O. Bicknell, whose promotion to traffic manager of the Sacramento Northern, with headquarters at San Francisco, Cal., was announced in the *Railway Age* of April 25, was born at Vincennes, Ind., on March 22, 1869. He began railway work in January, 1888, with the Evansville & Terre Haute, at Vincennes, as bill clerk in the local freight office. The following year he was promoted to agent of the same road at Patoka, Ind. In November, 1891, he went to the Southern Pacific as operator and ticket clerk at Deming, N. M., since which he has been consecutively traveling freight and passenger agent with headquarters at El Paso, Texas, until August, 1895; general freight and passenger agent of the Maricopa & Phoenix at Phoenix, Ariz., until January, 1898; superintendent of the same road until January, 1902; general freight and passenger agent of the Arizona Eastern and Southern Pacific until 1907; assistant general freight and passenger agent of the Southern Pacific, Pacific System, with headquarters at Tucson, Ariz.; chairman Arizona Railway Commission at Phoenix, Ariz., until 1909; chairman trans-continental bureau at San Francisco, Cal., until 1910; assistant to the president of the Sacramento Northern which position he held until his recent appointment.

Obituary

James W. Leonard, formerly, from January, 1911, to 1915, assistant to vice-president on the Canadian Pacific, at Montreal, Que., died on April 28, at Brampton, Ont. He was born in 1858 at Epsom, Ont., and began railway work in 1872 as a telegraph operator and agent on the Midland Railway of Canada. He later served on a number of different roads, until May, 1884, when he was appointed superintendent of the Canadian Pacific, and subsequently was consecutively general superintendent, Western division; manager of construction; assistant general manager, Eastern lines; general manager of the same lines, and assistant to vice-president of the same road. On January 1, 1915, he left the service of the Canadian Pacific to assume the general management of the Toronto Terminal Railway, at Toronto, Ont.

C. E. Dewey, freight traffic manager of the Grand Trunk Railway System, with headquarters at Montreal, Que., died on May 15, at Atlantic City, N. J. He was born in 1873, at Cheshunt, England, and in 1888 entered the service of the Grand Trunk as an apprentice clerk in the freight agent's office at Toronto, Ont. After serving as chief clerk to the division freight agent at Stratford and at Hamilton, he was appointed district freight agent at Stratford in 1899, and was promoted to district freight agent at Toronto in 1902. He went to Montreal in 1907 as assistant general freight agent, and in the following year was made general freight agent of the Central Vermont. In 1911, he was appointed general freight agent of the Grand Trunk Pacific at Winnipeg, and two years later he returned to Montreal and was appointed freight traffic manager of the Grand Trunk Railway System.



C. E. Dewey